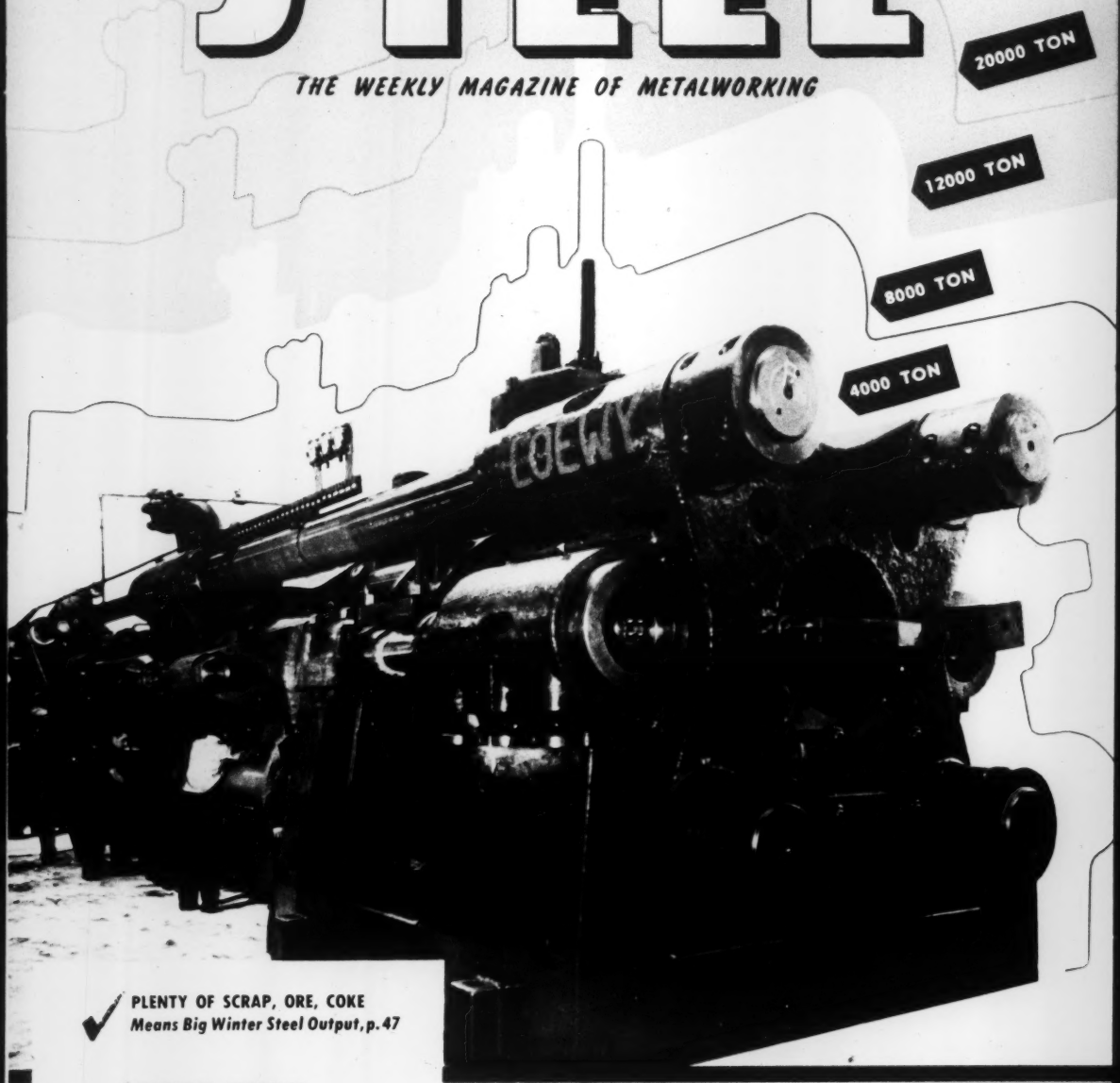
DECEMBER 1, 1952

STEEL

THE WEEKLY MAGAZINE OF METALWORKING



✓ **PLENTY OF SCRAP, ORE, COKE**
Means Big Winter Steel Output, p. 47

✓ **PERSONNEL CONVEYOR**
A Look to the Future, p. 58

✓ **WATCH CHARM TUBE MILL**
Specializes in Small Sizes, p. 90

HEAVY PRESS CHALLENGE

Large extrusion presses like this one are forerunners of bigger ones coming, p. 76

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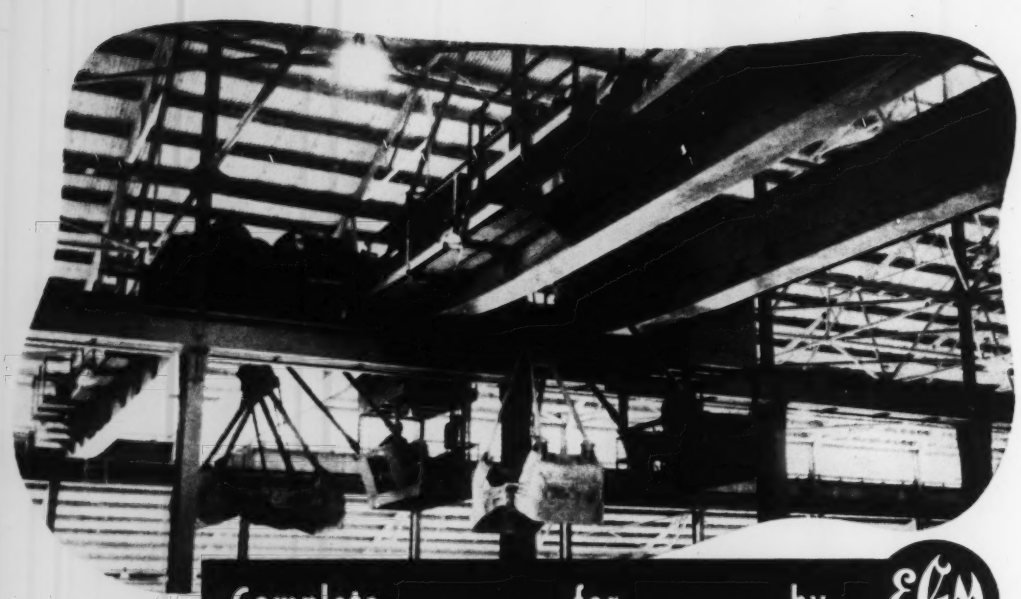
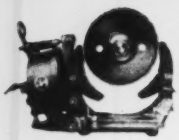
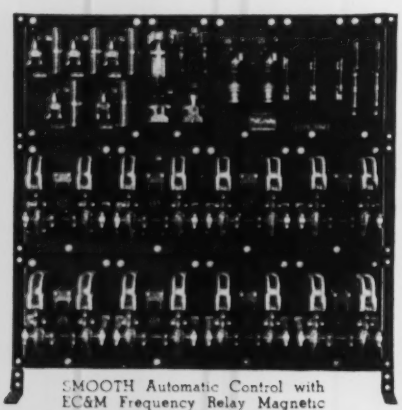


Complete for by EC&M

SHORT THROW Narrow-width Cam Master Switches are easy on the operator.



LONG - LIFE Brakes give high-speed performance — with low up-keep.



SMOOTH Automatic Control with EC&M Frequency Relay Magnetic Controllers.

Users Know EC&M Equipment Gives Top Performance . . . Low Up-Keep

EC&M Crane Apparatus and Control Engineering have a reputation for eliminating initial delays and for permitting production to be maintained at a high level throughout the life of the investment.

EC&M Crane Equipment is specially engineered for *each* crane. EC&M has *always* built control from the crane data sheet. Relay-settings, resistor-fillings, brake-windings, etc., are matched to the actual crane-loading. Result is top performance right from the start.

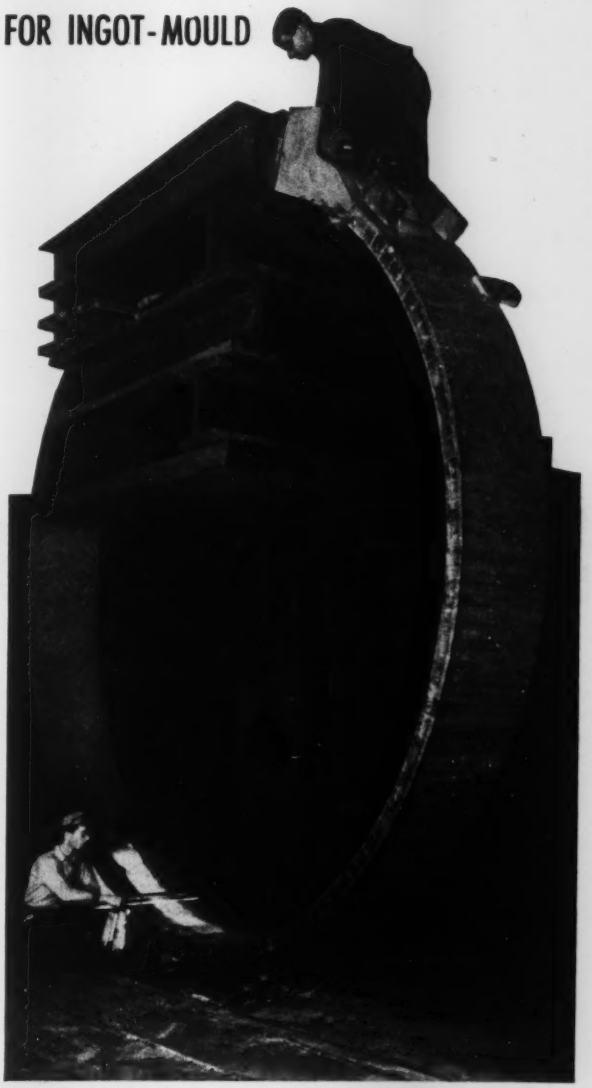
Many crane users, when buying new cranes or revamping existing installations, specify EC&M Control. They know the extra margin of safety built into EC&M Equipment and the accurate engineering of the apparatus result in freedom from delays smooth performance. Write EC&M into the specifications for your next crane.

THE ELECTRIC CONTROLLER & MFG. CO.
2698 EAST 79th STREET • CLEVELAND 4, OHIO

When Buying Cranes...Specify EC&M CONTROL

18,000-lb Mould-Band Made by Welding

FABRICATED IN TWO SECTIONS FOR INGOT-MOULD



This giant ring of steel, weighing approximately 9 tons, is one of three identical mould-bands, made recently for use in a 134-in. ingot-mould. Each band is 15 ft, 4 in. in outside diameter, 22 in. wide, and 4 in. thick. The end lugs are of forged steel. The bands were fabricated in halves. Welding was done in Bethlehem's Weldments Shop.

Practically any type of mould, press, machine or machine part can be made economically by using Bethlehem Weldments. They eliminate excess weight, without sacrifice in rigidity, often leading to reduction in cost of manufacture. Besides, these weldments are extremely versatile, as they can be produced in a wide range of sizes, either as simple parts or intricate assemblies.

Bethlehem Weldments offer full freedom in product design, because the steel from which they are made can be bent, pressed or otherwise shaped prior to welding, without harm to its physical structure. They can also be combined effectively with forgings or castings.

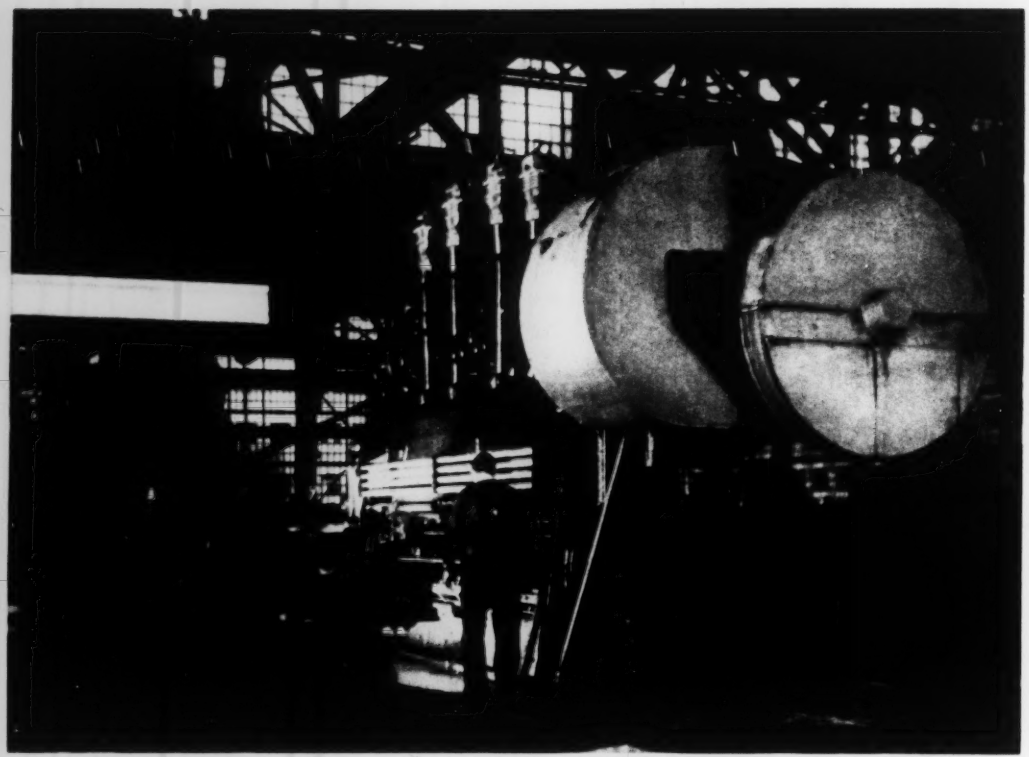
Perhaps you could use Bethlehem Weldments advantageously. Why not talk it over? Write to the nearest Bethlehem office, and we'll arrange for a Bethlehem representative to see you at your convenience.

BETHLEHEM STEEL COMPANY
BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. *Export Distributor:* Bethlehem Steel Export Corporation

BETHLEHEM STEEL

BETHLEHEM WELDMENTS



How to get structural steel with a punch

The brutal way to do it is on a punch press.

But figuratively speaking, it takes much more than a punch press to put punch, or stamina, into structural steel. It takes quality control from blast furnace to end product... the kind you get from a team operation like Barium Steel Corporation.

That's the real punch behind this giant punch press at Barium's Phoenix Iron & Steel Company, which punches steel plate and structural steel. Phoenix Bridge Company, a subsidiary of Phoenix Iron & Steel, uses these products for constructing and engineering bridges, buildings, and other fabrications.

If these two companies can't solve your particular steel need, you'll probably find the answer elsewhere in the Barium family. Barium's fifteen member companies supply industry with steel in many forms, and are ready to work as a self-contained unit to speed urgently needed orders.

Address your steel problem to Barium Steel Corporation at 25 Broad Street, New York City.

BOLTS
Bayonne Bolt Corporation

STEEL PLATE
Central Iron and Steel Company

PIG IRON
Chester Blast Furnace

CRANES AND HOISTS
Clyde Iron Works, Inc.

SPRINGS
Cuyahoga Spring Company

BOLTS AND NUTS
Erie Bolt and Nut Company

METAL STAMPINGS
Geometric Stamping Company

DROP FORGINGS
Globe Forge, Inc.

HEAVY PLATE DIE FORGINGS
Industrial Forge and Steel, Inc.

AIRCRAFT ENGINES AND PRECISION ASSEMBLIES
Jacobs Aircraft Engine Company

MARINE DIESEL AND GASOLINE ENGINES
Kermath Manufacturing Company
Kermath Limited (Canada)

STRUCTURAL SHAPES AND STEEL FABRICATIONS
Phoenix Bridge Company
Phoenix Iron and Steel Company

BARGES AND TUGS
Wiley Manufacturing Company

You helped design these better ropes

The needs of *your* particular job dictate the design and construction of Macwhyte Wire Rope. Over the years, Macwhyte engineers have kept in close touch with wire rope users in every field. Their experience — and yours — is combined to help produce rope that will give maximum performance . . . not just adequate performance.

Let us help you get the utmost in wire rope performance on your particular equipment. For prompt, accurate recommendations . . . . . call a Macwhyte distributor or write direct to Macwhyte Company.

MACWHYTE COMPANY
KENOSHA, WIS.

MACWHYTE COMPANY

2912 Fourteenth Avenue, Kenosha, Wisconsin

Manufacturers of Internally Lubricated PREformed Wire Rope, Braided Wire Rope Slings, Aircraft Cables and Assemblies, Monel Metal, Stainless Steel Wire Rope and Wire Rope Assemblies. Mill depots: New York • Pittsburgh • Chicago • St. Paul • Fort Worth • Portland • Seattle • San Francisco • Los Angeles. Distributors throughout U. S. A.

A thousand and one wire ropes
PREformed and internally lubricated
Ask for Catalog G-15

1023

They rolled away their troubles on this strip pickling line

On this continuous steel cleaning line—combining shot blast cleaning and pickling—stainless steel strip is passed along over and under rubber covered rolls specified by the G.T.M.—Goodyear Technical Man.

During processing, the steel strip undergoes shot blasting, as well as pickling in 16% sulphuric acid at 185°-190° and 12% nitric-hydrofluoric acid at 150°. The rubber hold-down and carrying rolls rotate in these acid solutions.

Special rubber compounds, specified by the G.T.M., are built into the roll covering to resist this heat and acid action. Result is longer life and more trouble-free service.

Goodyear's rubber rolls resist heat, chemicals, oil, abrasion, or other roll-killing conditions. Each covering is tailor-made to make the roll function as designed. "Superbonding" process permanently bonds rubber covering to the metal core.

Why not discuss *your* roll requirements with the G.T.M. now? You can reach him by writing Goodyear, Mechanical Goods Division, Akron 16, Ohio.

LOOK FOR YOUR GOODYEAR INDUSTRIAL RUBBER PRODUCTS DISTRIBUTOR *in the Yellow Pages of Your Telephone Directory under "Rubber Products" or "Rubber Goods." He handles Hose, Flat Belts, V-Belts, Molded Goods, Packing, Tank Lining, Rubber-Covered Rolls built to the world's highest standard of quality.*

GOODYEAR

THE GREATEST NAME IN RUBBER

We think you'll like "THE GREATEST STORY EVER TOLD"—Every Sunday—ABC Network

This Week in Metalworking

STEEL

Vol. 131 No. 22 Dec. 1, 1952

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To polish molds for Bakelite fishing reel ends, Horrocks-Ibbotson uses Elgin DYMO grades 45, 9 and 3.

Note high finish on molded parts of reel.

ELGIN DIAMOND

Makes Mold Polishing More Than TWICE AS FAST

...at **HORROCKS-IBBOTSON COMPANY** of Utica, New York, known by sportsmen everywhere for famous fishing tackle. Mold maintenance costs are also reduced by more than 70%. Such savings are natural with Elgin Diamond . . . precision graded by Elgin at Elgin—home of master craftsmen, delivered in ready-to-use plastic cartridges and color identified for errorless grade identification. You can achieve similar cost reductions in your own shop . . . assure predictable, superior polishing results with maximum cutting speed. Join the other leaders who . . .

Finish with Diamond ... ELGIN Diamond!

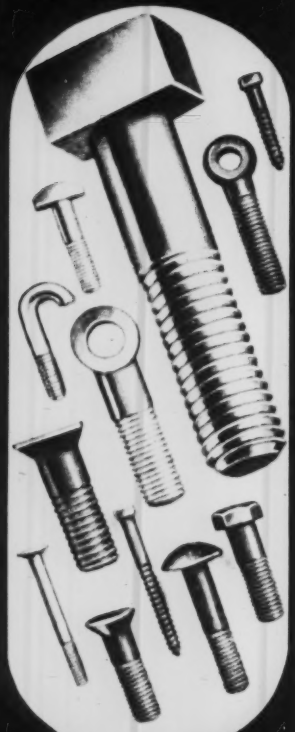
DYMO ...FOR GENERAL POLISHING | DYMO C ...FOR CARBIDES

ABRASIVES DIVISION DEPT C
ELGIN NATIONAL WATCH COMPANY
ELGIN, ILLINOIS

THREADED SPECIALTIES

TEE BOLTS

by an exclusive method



Among Pawtucket's many specialty products, these lower-cost tee-head bolts are the leaders in this field. Pawtucket's exclusive production method keeps cost low, dimensional accuracy unusually high and strength above standard.

Pawtucket tee-head bolts are made in standard sizes ¼" and larger, or to your specifications. In any size, you can depend on a uniform Class 3 fit, if required.

BETTER BOLTS SINCE 1882

PAWTUCKET

MANUFACTURING COMPANY

327 Pine Street Pawtucket, R. I.

Now We Know

While we were researching in Webster for the spelling of the word "perfervid" we came across this gem of information. Perigynous means borne on a ring or cup of the torus surrounding the pistil, as the stamens or petals; having stamens and petals so situated. Ah-ha! So that's it!

Cover Stuff

We were just up talking to Ed Karpick who handled the story on the heavy press program for this issue. He tells us that the cover picture is from Loewy Construction Co., New York, and is a shot of one of their extrusion presses. This 4000-ton giant works for International Nickel in their Huntington, W. Va., plant. Originally designed for extruding nickel and nickel alloys it has also been used on steel.

While this one is by all standards a huge machine it's dwarfed by the presses ranging up to 20,000 tons in the new program. It is, however, a good illustration of heavy extrusion. No pictures, by the way, are available of the heavier presses since none of them is completed.

STEEL Series

Managing Editor Walt Campbell tells us that the editors plan to run a series of 10 special articles during 1953. Each one will deal with some different phase of the overall theme, "Program for Management."

A couple of the subjects covered will be handling and distribution, government relations, labor and industry relations and new materials. Many of you will already have noticed this in some promotional material sent out concerning this year's yearbook.

Sal Marino, our promotional man, also called our attention to the subscription card in this week's issue. Some special STEEL articles will be given with submitted subscriptions. These articles include the story on the Fairless Works and the Tool Steel Guide.

Special Weeks

Following through on schedule we are honored to inform you that this is another double-barrelled week. It's Hotel Week and also Prosperity Week.

Speaking of hotels the last time we were in one was when we attended a formal tea announcing the engagement of a friend of ours. We're about as graceful at those functions as a mermaid in the high hurdles, and besides, we knew about the impending marriage a month before the party. Most successful moment of the evening was when we learned the bride's father was an avid reader of STEEL and a perennial trier of our puzzles.

Puzzle Corner

The puzzle in the Nov. 17th issue of STEEL was about pouring some wine into some water and then pouring the mixture back. We were sure we knew what the answer was without even using any math. Then we got an answer and it disagreed with us. We promptly got out the pencil and along with Assistant Editor Tom Hruby we used a couple of sheets of paper and finally got the answer. The amount of wine taken from the bottle equals the water taken from the jug.

The man who submitted the answer which started us figuring is L. D. Rice, Timken Roller Bearing Co., who's one of our regulars. We'd like to offer a loud applause and feet-stamping for his ability to never miss.

Another reader has come up with the right solution to this one. He is Orville F. Jones, J. I. Case Co. We should point out another thing here. The right answer is the one that came with the puzzle and we just didn't believe it. Now we see it all.

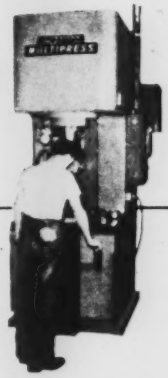
Here's the one for this week: Sam, who's 5 ft-8 in., tall was digging a hole. When we asked how much deeper he was going to dig he said twice as deep, and then the top of his head would be twice as far below the surface of the ground as it was then above the surface. How deep is the hole?

Shrdlu

(Metalworking Outlook—Page 39)

G-E Report Verifies Advantages of Hydraulic Presses

. . . Added Proof that MULTIPRESS® CUTS COSTS on ASSEMBLY



More proof that the right use of hydraulic pressure cuts staking costs several ways! General Electric's own experience with Multipress, in their Meter and Instrument Division, echoes gains reported by dozens of other users.

With Multipress, ram speeds and pressures are closely adjustable to each different job need, and are *automatically controlled* for continuous accuracy. This eliminates the need for skilled operators.

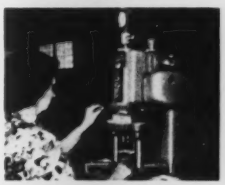
In addition, Multipress does the work *without sudden impact.* Working pressures build up *after* tooling contacts the parts. Among other advantages, this cuts tool wear and ends a major cause of tool damage.

But Multipress assures even bigger gains in reduced scrap losses, because its smooth action lets metals "flow" into place without losing their normal tension characteristics. At G-E, scrap on staking operations had often run from 5 to 25 per cent. Multipress cut these losses to *one per cent or less.*

Ease and safety of operation — plus quietness — are added Multipress features. And most Multipress advantages apply also to many other production jobs — bending, drawing, flaring, stamping, forming, blanking, riveting, and so on.

Write today for full information on Multipress and its many accessories for special needs.

Multipress offers 8 frame sizes. Capacities range from one-ton to the 50-ton unit shown directly above. Model at upper left, equipped with Multipress Index Table, automatically rotates parts under press ram. Note handy storage of parts at center of table dial.



The Multipress "Midget" offers one-ton capacity.

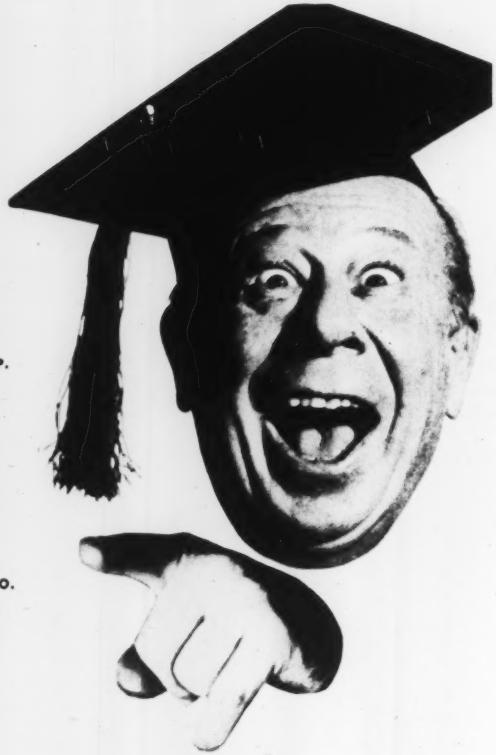
The DENISON Engineering Company
1163 Dublin Road, Columbus 16, Ohio

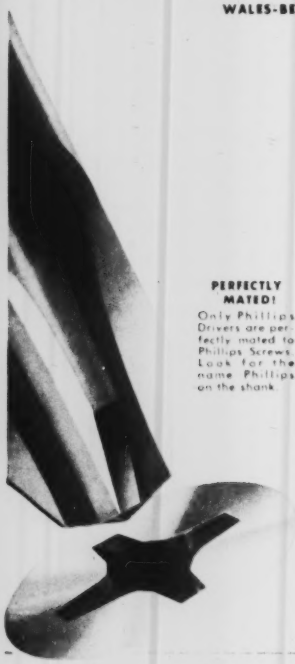
DENISON HydrOILics

Q.

Which of these 23 firms can reduce your costs—increase your sales?

AMERICAN SCREW CO. • ATLANTIC SCREW WORKS, INC
THE BLAKE & JOHNSON CO. • CAMCAR SCREW & MFG. CORP.
CENTRAL SCREW CO. • CONTINENTAL SCREW CO.
THE EAGLE LOCK CO. • ELCO TOOL AND SCREW CORP.
GREAT LAKES SCREW CORP. • THE H. M. HARPER CO.
THE LAMSON & SESSIONS CO. • NATIONAL LOCK CO.
THE NATIONAL SCREW & MFG. CO. • PARKER-KALON CORP.
PHEOLL MFG. CO. • ROCKFORD SCREW PRODUCTS CO.
SCOVILL MFG. CO. • SHAKEPROOF INC.
SOUTHERN SCREW COMPANY • THE SOUTHINGTON HDWE. MFG. CO.
STERLING BOLT CO. • STRONGHOLD SCREW PRODUCTS, INC.
WALES-BEECH CORP.





PERFECTLY MATED! Only Phillips Drivers are perfectly mated to Phillips Screws. Look for the name Phillips on the shank.

A. *All of them . . . because all of them make Phillips Cross-Recessed-Head Screws*

Your customers recognize these nationally advertised fasteners as the clue to quality. Millions of readers of The SATURDAY EVENING POST are being constantly reminded that "X marks the spot." So, they're looking for Phillips Screws on the products they buy. That means extra sales for you.

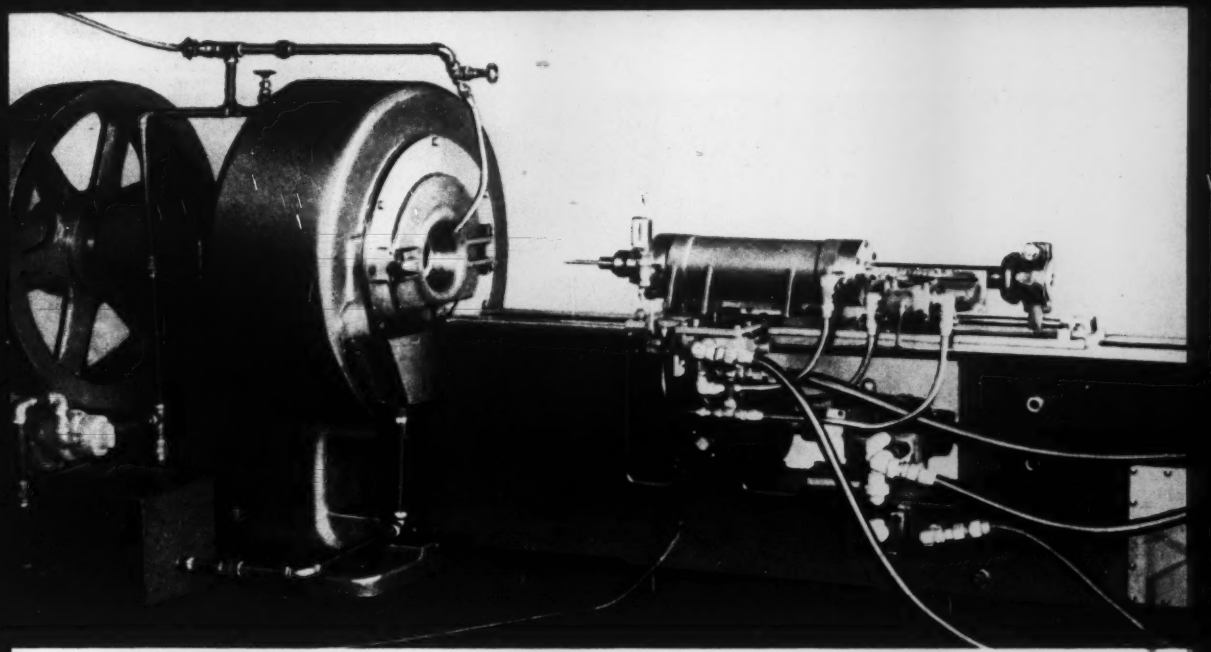
And that's not all. You save time, work, and money with Phillips Wood, Machine, Tapping Screws or "Sems." They save up to 50% driving time, set up tighter, reduce damage due to slippage. Use them more . . . and get more sales.

X marks the spot . . . the mark of extra quality

PHILLIPS *Cross-Recessed-Head* SCREWS

As Advertised in POST

THE FASTENERS OF TODAY . . . AND OF THE FUTURE



FENN SWAGING MACHINE, featuring hydraulic feed, automatic chucking, and oil-cooled dies, is fast replacing lathes and screw machines for shaping a wide range of metal parts because it . . .

MAKES METAL GO TWICE AS FAR

Yes, you can cut your metal requirements in half, in many cases, with this Fenn Swaging Machine. That's because it doubles the length of the blanks it shapes . . . with absolutely no stock removal.

MANY OTHER ADVANTAGES

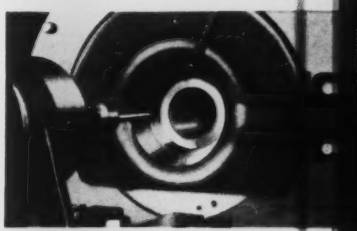
What's more, this Fenn Swager produces a denser structure in metal parts . . . maintains concentricity . . . gives an improved finish . . . requiring no subsequent grinding . . . calls for less operator skill than any other machine capable of producing equivalent parts.

WRITE FOR SPECIFICATIONS

It will pay you to investigate all the cost-cutting, material-saving advantages of the Fenn Swager. Contact the Fenn distributor nearest you for facts and delivery schedules, or write direct to THE FENN MANUFACTURING COMPANY, 1847 Broad St., Hartford 1, Conn.

FENN

Shaping metal for better and stronger products at lower cost



SIMPLE DIE CHANGES, using blanks in various diameters, make Fenn Swaging Machines quickly and easily adaptable to a wide variety of jobs. You can use them for reducing, pointing, or forming bar stock or tubing. Also for assembling fittings to cables. Fenn Swagers and Hydro-Formers come in sizes and designs for every swaging need.

FENN MACHINES ARE SOLD BY:

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Refer: Calco Mach'y Co., Phila.
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BOSTON
Refer: C. Toolin, Providence
BUFFALO
Syracuse Supply Co.
CHICAGO
Neff Kohlbusch & Bissell, Inc.
CINCINNATI
The Seifreat-Elstad Machinery Co.
CLEVELAND
Wm. K. Stamets Co.
COLUMBUS
The Seifreat-Elstad Machinery Co.
DALLAS
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HOUSTON
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KANSAS CITY, MO.
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PROVIDENCE
Charles Toolin
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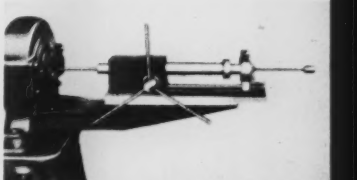
Indianapolis Machinery Export Co., Inc., New York, N. Y.



FENN FEEDING DEVICES, either manually or hydraulically operated, are available for all sizes of swagers. They speed up production and reduce operator fatigue.

somewhere in your building,
lurking like a cat....
fire is ready to pounce.
In flammable liquids,
electrical equipment, record
vaults. Your surest protection
is a Kidde Fully Automatic
CO_2 Fire Extinguishing System.

quick as a mouse, check the "Yellow Pages" for your KIDDE dealer

Kidde

Walter Kidde & Company, Inc.,
1260 Main Street, Belleville 9, N. J.

Walter Kidde & Company of Canada, Ltd., Montreal, P. Q.

Don't Be Misled

That chart on the cover of the Nov. 17 issue was as misleading as the mill run of Harry's statements of late. Projected on a factual basis, the illustration of the stacked coins is shown to be greatly out of proportion just as the small business share of the defense dollar has been misrepresented elsewhere.

As It Appeared in STEEL

As It Appears in Exact Proportion

Leave us alone and we, small business firms, will survive without any paternalism. But, for heaven's sake, don't slant your graphs to show, or lead the mind to believe, we have tripled our sales in the past four years.

Actually, we do just as well as we can on the mill steel we can beg from the mills. No more, no less.

Of course, your magazine is tops.

Rodman C. Pruitt
Seymour Tool & Engineering Co. Inc.
Seymour, Ind.

• *You point up an editorial problem with which we have wrestled for years. How to make statistics graphic and dramatic when the statistics show only a moderate, but still significant, trend. We have finally evolved this solution: Use artistic license to exaggerate the value slightly in the chart form, but clearly and prominently print the actual numerical figures so that nobody is misled. We realize our solution is not perfect. We have consulted graph experts on the matter, and the consensus is that our practice is ethical.—ED.*

Radioactivity: Research Aid

We will appreciate your sending 2 tear sheets of your article "Radioactive Tracers Aid Blast Furnace Research" (Sept. 10, 1951, p. 102).

Leon Leventhal
Tracerlab, Inc.
Berkeley, Calif.

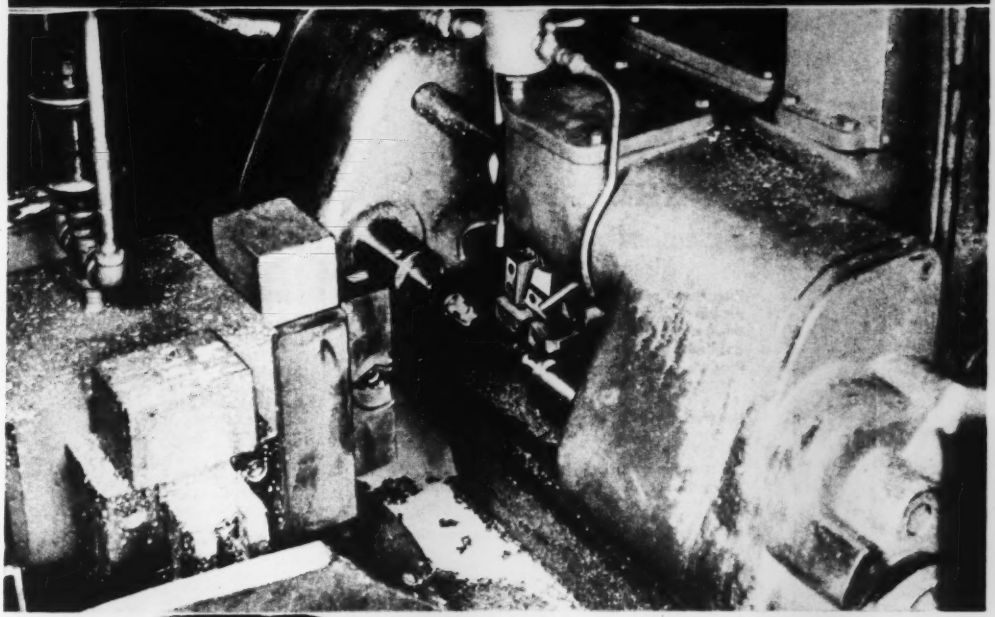
• *They're sent.—ED.*

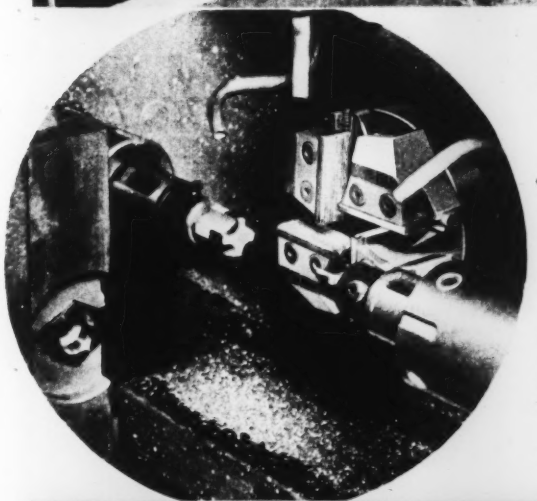
Old But Not Forgotten

During the past year we have been a regular subscriber of STEEL. These issues, we feel, contain many valuable articles and bits of information. However, we are unable to utilize this

Continued on following page

57% Less Threading Cost
ON AUTOMATIC CHUCKING MACHINE





A *LANDIS* Solid Adjustable Die Head cut the cost of one threading operation in the plant of a large Middle Western manufacturer by 57%.

The operation, performed on a Goss and DeLeeuw Automatic Chucking Machine, required the cutting of a 1 11/16" diameter 14 pitch thread ½" long on cast brass valve bodies. Prescribed tolerances were easily maintained.

The *LANDIS* Head fit perfectly into the highspeed cycle of the chucking machine, and produced an average of 210 finished pieces per hour, revolving at 385 RPM. Major factors in the efficiency of this *LANDIS* Head were low down-time and low tool cost, occasioned by long tool life. Output of finished pieces averaged from 4,000 to 5,000 between chaser grindings.

Please send job and machine specifications with your request for additional information.

LANDIS *Machine* COMPANY WAYNESBORO PENNSYLVANIA

Turn problems into *profits*

with GORHAM-Engineered Special Cutting Tools

For fast, practical solutions to tough tooling problems, call in the expert . . . your nearby Gorham Field Engineer! He provides a complete engineering service to determine your exact tooling requirements. For instance:

•

He starts with your product, sketch or idea.

•

He surveys your production operations and your available equipment.

•

He considers work material properties and desired finishes and tolerances.

•

He plots proper machine feed, speed and method of tool driving.

•

then . . . he develops practical design and engineering specifications for a special cutting tool, metallurgically "tailor-made" for your application.

•

. . . *and* his recommendations are backed by Gorham's unmatched facilities! These include three fully-equipped manufacturing plants, large Engineering and Metallurgical staffs, and the finest heat treating equipment.

These resources, plus Gorham's more than thirty years' reputation for producing the finest cutting tools, are dedicated to furnishing prompt and profitable solutions to your special tooling problems. Gorham-engineered "specials" are turning problems into profits in thousands of plants every day . . . why not let them do the same for *you?*

If you haven't met your nearby Gorham field Engineer, write for his name, or send details of your problem direct for recommendations.

Gorham TOOL COMPANY

"EVERYTHING IN STANDARD AND SPECIAL CUTTING TOOLS"

14401 WOODROW WILSON • DETROIT 3, MICHIGAN

LETTERS

Concluded from preceding page

wealth of material because we do not have any convenient or suitable index to the contents.

We presume that you already publish separate indexes to cover your past issues. If so, we would be most pleased to secure a copy. Our first copy of your magazine is dated Jan. 28, 1952.

Kent B. Arnold
Arnold Gauge Co.
Flint, Mich.

• *Yes, they're available on request, and the appropriate indexes are on their way to you.—ED.*

Editorial Praises

May we say 'Thank you' and also compliment you on the fine editorial "Hope and Challenge" (Nov. 10, p. 65).

The viewpoints you are expressing cover all Americans and what you have been saying right along has always been to the point for America. Continue the good work.

James M. Stewart
Elgin Softener Corp.
Elgin, Ill.

Congratulations on the courageous and well-expressed editorial "Why I Will Vote" on the cover of STEEL's Oct. 27 issue.

You sure did a swell job of stating the problem and the means by which we can obtain the answer, in a very few words.

R. C. Wayne
Surface Combustion Corp.
Toledo, O.

Your editorial "To Heart and Head" (Jan. 21, p. 29) is not the first one I have clipped from STEEL.

Well, the average voter did not prove to be as selfish and short-sighted as those particular politicians thought he was. For which we can all be thankful.

More power to you and all other clear-thinking patriotic Americans.

Carl G. Browne
general sales manager
Sweet's Steel Co.
Williamsport, Pa.

Spreading Hope and Challenge

The writer has just read with much interest your editorial "Hope and Challenge" and on the reverse side "The Metalworking Outlook."

I consider this very timely and important.

Therefore, I would like you to send me 100 copies of the same which will be mailed to our salesmen and sales agents throughout the United States.

J. B. Doan
chairman
The American Tool Works Co.
Cincinnati, O.

• *They're on the way.—ED.*

The Reprint Department

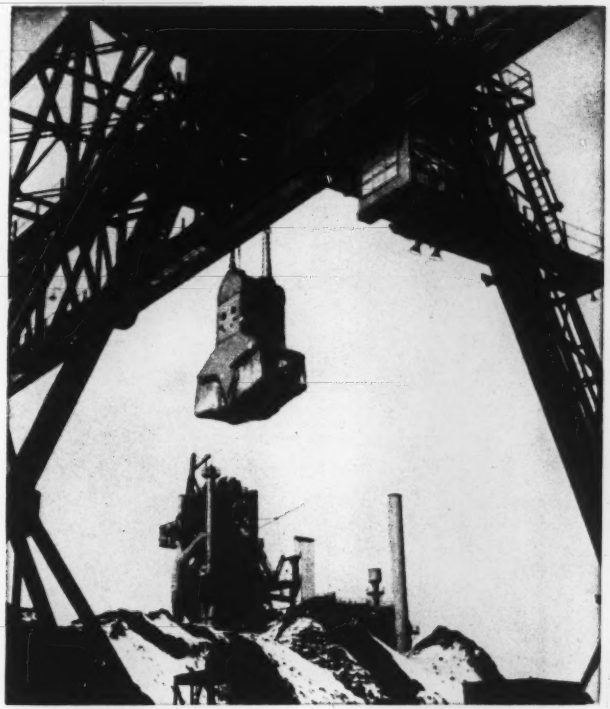
We would appreciate getting 2 copies of the "Production and Engineering News at a Glance" page from your Oct. 27 issue.

Joseph K. Sherman
Ambrit Corp.
Stamford, Conn.

Please send me a half dozen reprints of the article "New Plant Layout Streamlines Production" (Oct. 27, p. 74).

F. W. Liebenrood
E. W. Buschman Co.
Cincinnati, O.

• *They're on the way.—ED.*



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When Your BETTER PRODUCTION PLANS *Call For* Heavy Bulk Materials Handling Equipment

Depend On Heyl & Patterson *For* Advanced Design *and* Controlled Low Cost

The Heyl & Patterson "TURN-KEY WAY" is a plan of operation wherein each essential function, from design to guaranteed successful operation is performed completely within our own organization.

The "TURN-KEY WAY" enables Heyl & Patterson to guarantee successful operation and Controlled Low Cost.

It calls for Engineers, Fabricators and Erectors instilled with the urge for constant improvements . . . improvements based on actual past experience and on modern thinking and planning with one objective . . . *Designing, Fabricating* and *Erecting Better Heavy Bulk Materials Handling Equipment.*

Heyl & Patterson Engineers have undivided responsibility for the successful operation of all H&P projects. They call the signals and then the H&P Team goes into action.

We have *OUR OWN* Engineering Department . . . *OUR OWN* Research Department . . . *OUR OWN* Structural Shop . . . *OUR OWN* Machine Shop . . . *OUR OWN* Erection Department.

All departments work in complete harmony with a mutual understanding that the completed project has to be another tribute to the world-wide reputation of Heyl & Patterson.

- Ore Bridges
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- Cyclone Thickeners
- Thermal Dryers
- The Drying Dutchman
- Reineveld Centrifugal Dryer

Heyl & Patterson, Inc.

"SINCE 1887"

Heavy Bulk Materials Handling Equipment

All The Way from Design to Erection

55 WATER STREET · PITTSBURGH 22, PA.

if

all the operators of all the machine tools now in use could improve their efficiency by only 5%, they would add more to the nation's output of metal products than could be produced by all the new machine tools built in any one year.

WARNER & SWASEY
Cleveland

YOU CAN MACHINE IT BETTER, FASTER, FOR LESS WITH WARNER & SWASEY TURRET LATHES, AUTOMATICS, AND TAPPING MACHINES

FORD MOTOR COMPANY OFFICIALS INSPECT THE INTERCHANGEABLE UNITS OF THE . . .

New G-E Motor Control Center

Since January, over 10,000 men from production and management of leading industries (see above) have taken a thorough look at the latest equipment for the centralized control of a-c motors up to 200 hp. Their reports indicate enthusiastic approval of what they saw. Here's why:

VERSATILE. Because units are easily interchangeable without waste space, a variety of arrangements can be made. For example—two Size 1 or 2 starter units require the same space as a Size 1, 2, or 3 reversing starter.

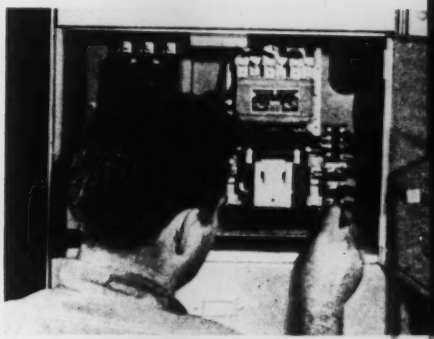
ACCESSIBLE. A four-inch continuous wiring trough provides ample wiring space. Components are mounted on an easy-to-handle frame and accessible from all sides when lifted from cabinet. Starters are front-connected. Master terminal boards can be swung out of compartment for extra working space around conduit.

PROTECTED. Will withstand 25,000 amperes RMS short-circuit current, substantiated by certified Laboratory tests.

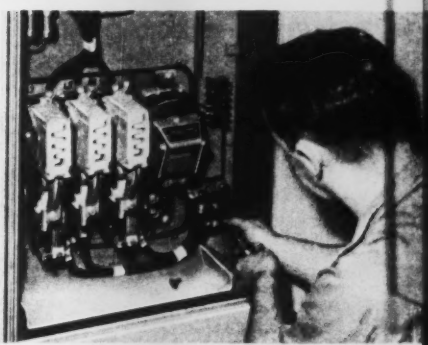
For more information on this new G-E motor control center, contact your nearest G-E apparatus sales office or write for Bulletin GEA-4979A today. *General Electric Company, Schenectady 5, N. Y.* 730-42

GENERAL ELECTRIC

EASY TO INSTALL AND INSPECT. Interchangeable units; main bus completely accessible; incoming line connections are easily made.



EASY TO WIRE. Four-inch wiring trough; components accessible from all sides; front-connected starters; doors swing more than 90°.



EASY TO SERVICE. Units are easily disconnected from bus and locked in test position (above). Barriers between units are easily removed to facilitate wiring (below).

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Hydroforming

Improves the quality of deep drawn parts

CINCINNATI 26" HYDROFORM

Also built in 12", 19", 23" and 32" standard sizes. Machine size indicates maximum blank diameter that can be formed. Material thickness can range from foils to 3/8" steel.

Write for your copy of Hydroform Bulletin M-1759

Hydroform

THE CINCINNATI MILLING MACHINE CO.
CINCINNATI 9, OHIO

Here's deep drawing with a kid glove touch!

Pre-polished blanks of 20-gage Type 302 Stainless Steel, having a protective plastic coating over the entire blank surface, were Hydroformed in one operation to produce the Corner Ball shown above. The fact that Hydroforming does not impair the finish of the material is dramatically illustrated here, as these parts are drawn with the plastic coating *still intact!*

CINCINNATI

Deep drawing by the Hydroforming process utilizes a punch working upward into a universal die member—an oil cavity sealed by a flexible diaphragm. Sheet materials are formed to the shape of the punch by controlled hydraulic pressure.

SURFACE FINISH IS UNIMPAIRED

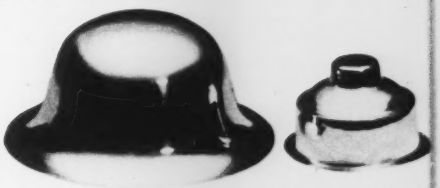
The cushioned action of the flexible die member cannot mar the surface of the material being formed. Parts can be formed *after* the material is painted, plated, lithographed or highly polished.

Conventional drawing methods leave a succession of draw marks on parts produced by two or more draws. The number of draws required to Hydroform a part does not affect the surface finish quality.

MECHANICAL VALUES ARE IMPROVED

Due to the unique drawing action, Hydroforming retains higher mechanical and physical values in the part. Because the material is uniformly worked during the draw, localized thin-out is either greatly reduced or eliminated. Hydroforming reduces springback, improving the dimensional accuracy of the part.

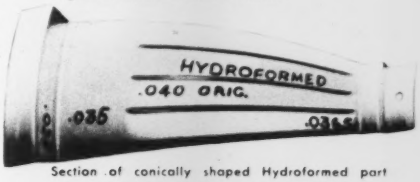
In addition to substantial savings on secondary finishing operations, Hydroform users report improved part quality—greatly reduced tool costs—savings in materials—reduction in the number of required operations on many parts—less time required between release of drawings and the production of part samples—many other benefits. Can *your* manufacturing program use similar economies? Then investigate Hydroforming *now*—it will change your thinking on deep drawing and forming! Contact your nearest Cincinnati Milling Machine Co. representative for full information.



Sterling silver bowl and salt shaker base Hydroformed without scratching or scuffing the extremely soft surfaces. Very little secondary work is required to produce the lustrous finish.

Cuff Link face of gold-plated brass, Hydroformed after plating.

Note draw marks on part at right, produced by conventional method in 7 operations. Same part at left, produced in 3 operations by Hydroforming, has unmarred surface finish.



Section of conically shaped Hydroformed part gaged to show reduction of material thickness by forming. Note loss of only 0.005" and 0.0035" in the areas indicated. Identical section of this part produced by conventional method shows from 6% to 25% greater material reduction in same areas.

Our 70th Yuletide Message to Our Customers and Friends

We of Frederic B. Stevens Inc., wish you a most joyous Holiday Season and unbounded good fortune during the coming year.

We wish to thank you for entrusting your business needs to our organization. We are deeply grateful for the loyalty you have shown to us . . . and we are proud to count you among our friends.

So please accept these Holiday Wishes for health, happiness and good fortune . . . and add to them a sincere "Thank You" from all of us at Frederic B. Stevens Inc.

METAL FINISHING EQUIPMENT AND SUPPLIES SINCE 1883

FREDERIC B. STEVENS INCORPORATED

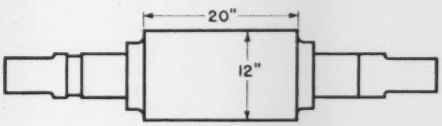
DETROIT 16, MICHIGAN

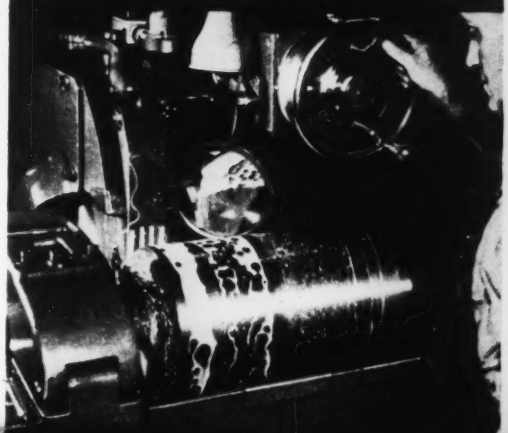
Landis Roll Grinder Regrinds Cold Strip Mill Rolls in 20 Minutes

The tremendous forces exerted between the rolls and strip in a cold rolling operation, not only shape the material to a desired dimension, but wear and scour the rolls. These rolls must be reground to restore the smooth surface and dimensional accuracy.

At the Signode Steel Strapping plant in Baltimore, a new Landis 20" x 96" Roll Grinder is used for this operation. Average floor-to-floor time is 20 minutes including set-up and grinding time. Ease of set-up and convenient grouping of controls makes this production possible.

This is another example of the production and operating advantages of Landis Grinders which can be economically applied to your grinding operations. Landis Tool Company, Waynesboro, Pennsylvania.





Work Data

Machine	Landis 20" x 96" Type FR Roll Grinder
Stock Removal	.005" on diameter
Crown	.002" on diameter
Finish	Good commercial
Time	20 minutes floor-to-floor

LANDIS

precision grinders

152A

Carrying hot steel for THREE YEARS

and these Hard-Faced rollers are still in use

Three years ago, some cast iron cone rollers for this cooling bed were hard-faced with HAYNES alloy No. 92. Today, they are still carrying hot steel bars despite the continual impact, abrasion, and heat to which they have been subjected. Cast steel rollers on the same line, which were hard-faced with HAYNES STELLITE alloy No. 6, have also shown exceptional service . although they have not yet been in use as long as the cast iron ones.

HAYNES alloy No. 92, an iron-base alloy recommended for the cast iron parts, is exceptionally easy to apply by oxy-acetylene welding. It has a very low melting point and the molten alloy is quite fluid. Deposits have a Rockwell C hardness of 62-67 and excellent wear resistance.

HAYNES STELLITE alloy No. 6, the cobalt-base alloy used for hard-facing the cast steel parts, can be applied by metallic arc welding. Deposits are machinable and have excellent resistance to abrasion and heat.

For information on how to hard-face cast iron and cast steel parts, and on the alloys recommended for each job, write for a copy of "HAYNES Hard-Facing Manual."

HAYNES alloys
TRADE MARK

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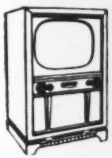
Report to Management from YALE Materials Handling Headquarters

Philco Famous for Quality the World Over

Cuts costs with Yale Electric Trucks

Famous for Quality in Materials Handling Equipment



What business are *you* in? Food-processing, motor freight-terminal operation, textiles, lumber, tool-making? Whatever it is—you *must* move materials from one point to another.

How many men do you employ? Ten—or ten thousand? Regardless of the number, efficient, economical handling of your materials is more important today than ever before.

It may mean the actual difference between profit and loss!

YALE MATERIALS HANDLING EQUIPMENT... is accounting for 50 to 75% savings in many businesses today—businesses that never realize how costly their old-fashioned handling methods were. Yale is the world's leading manufacturer of materials handling equipment. You can depend on Yale—to give expert attention to your specific handling needs.

YALE
MATERIALS HANDLING EQUIPMENT

Yale Electric Hydraulic fork trucks gave Philco—world-leader in electronic equipment—this 3-way saving...

- **MONEY SAVED!** Knocked the bottom out of handling costs in plant, warehouse and at shipping points.
- **LABOR SAVED!** The change-over from manual handling methods to mechanized Yale equipment greatly increased manpower's effectiveness—released extra men for more important productive work.
- **TIME SAVED!** Boosted parts handling, cut assembly time, spurred shipping operations, and eliminated many bottle-necks at times when increased production was absolutely essential!

MAIL THIS COUPON TODAY

The YALE & TOWNE Manufacturing Co., Dept. 812
Roosevelt Blvd. & Haldeman Ave., Philadelphia 15, Pa.

I want to know how Yale Materials Handling Equipment can help me.

- ☐ Please have your local Representative call.
- ☐ Please send free copy of THE PICTURE STORY OF YALE MATERIALS HANDLING EQUIPMENT.

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YALE GAS AND ELECTRIC INDUSTRIAL TRUCKS • YALE WORKSAVERS • YALE HAND TRUCKS • YALE HAND AND ELECTRIC HOISTS • YALE PUL-LIFTS

Sailor Beware! The Old Man of The Sea!

WHO has not read of Sinbad, as told in the Arabian Nights by glamorous Scheherazade?

Shipwrecked on a strange island, the unfortunate sailor came upon a weak old man. Moved by compassion, Sinbad took the feeble fellow on his back, carried him over the brook, gathered fruit and fed him. But when Sinbad asked him to get down, the old man refused, wrapping his legs about his neck, almost strangling him.

The sailor fainted and fell down, yet the old man clung ever closer. He rained blows on Sinbad, driving him about without rest, to pick fruit and do his pleasure. This went on and on, until the desperate sailor made wine from wild grapes to appease his own plight. One day noting Sinbad's pleasure, the old man snatched a gourd of wine and gulped it down. Completely drunk, he loosened his grip and Sinbad threw him off. Saved by a passing ship, his rescuers said, "You are the first ever to escape strangling by the Old Man of the Sea".

Dating back hundreds of years, the Old Man is an allusion familiar to everyone. He is a warning figure today. Our nation, surviving the storms of two world wars, wanders down strange ways. With kindly intent and glorying in its own strength, America is tempted to shoulder the Old World and its age-worn problems. But weak and feeble as the Old World appears to be, let us beware! How easy to assume a burden which would quickly exhaust our strength, strangle us as a nation, and in the end leave the world as weak and exhausted as it was before our foolish undertaking!

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MANUFACTURERS OF CARBON ALLOY AND YOLOY STEELS

RAILROAD TRACK SPIKES - CONDUIT - HOT AND COLD FINISHED CARBON AND ALLOY BARS - PIPE AND TUBULAR PRODUCTS - WIRE - ELECTROLYTIC TIN PLATE - COKE TIN PLATE - RODS - SHEETS - PLATES.

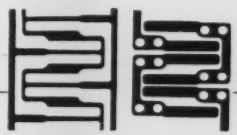
THE TREND IS TO MORE STAMPINGS WITH BLISS PRESSES

Bliss High Production Press, No. 630, one of six at Western Electric's Kearny Works.

At *Western Electric* Bliss Presses Produce Switchboard Stampings at 300 spm

For *really* high-volume production of precision stampings for telephone switchboards, Western Electric Company uses six Bliss High Production Presses at its Kearny (N. J.) Works. Equipped with precision roll feed and scrap shear, the Bliss units operate at speeds up to 300 spm and hold tolerances within .002" in progressive dies. And set-up time for die changeover in these Bliss automatic presses averages *only 30 minutes.*

Bliss High Production Presses are ideal for high-speed, short-stroke production and for progressive die work. This type of press was introduced by Bliss more than 20 years ago in keeping with its continuing policy of providing "the right press for a given job." Whether your job is stamping, drawing, forming or squeezing, it's wise to investigate Bliss *first.*



FOR EXAMPLE:

Hinge Spring (above)
.008" nickel silver; No. 630 Bliss press; progressive tool and automatic feed plus pilots; 125 spm; two parts per stroke, 9,000 parts per hour; 2,850,000 parts per year.

Contact Spring
.0225" nickel silver; No. 620 Bliss High Production Press; compound tool and automatic feed; 300 spm; 12,500 parts per hour; 1,200,000 parts per year.

Clamping Plate
.032" steel; No. 650 Bliss press; progressive tool and automatic feed plus pilots; 180 spm; five parts per stroke; 41,400 parts per hour and 5,700,000 parts per year.

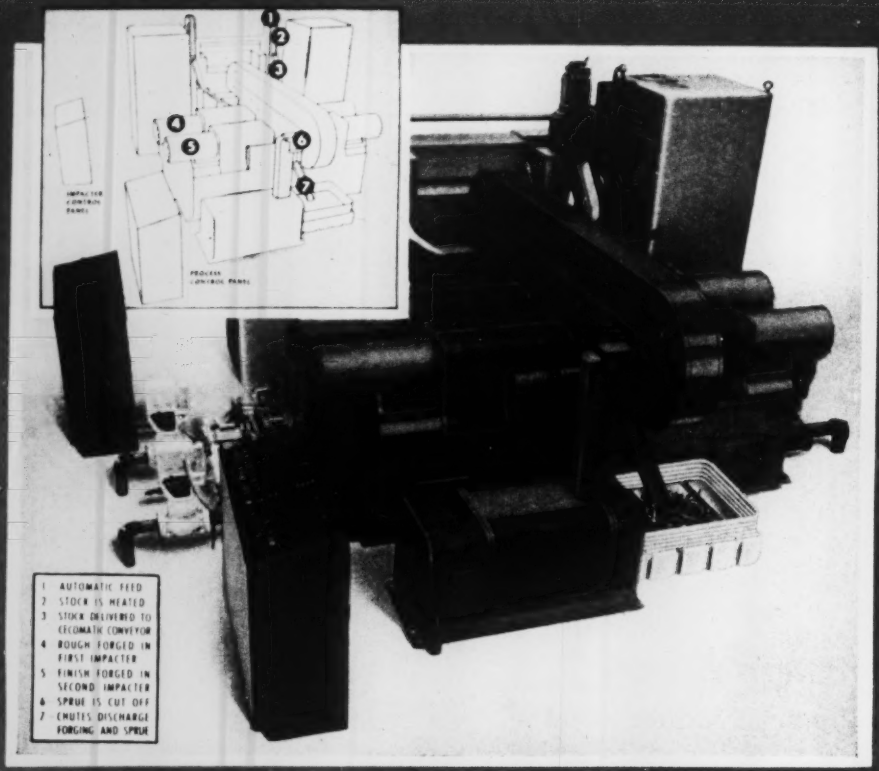
Contact Spring
.0131" nickel silver; No. 630 Bliss press; compound tool and automatic feed; 300 spm; 13,500 parts per hour; 6,850,000 parts per year.

E. W. BLISS COMPANY, CANTON, OHIO
E. W. Bliss (England) Ltd., Derby, England
E. W. Bliss Company (Paris), St. Ouen sur Seine, France
PRESSES, ROLLING MILLS, SPECIAL MACHINERY

Branch offices in Chicago, Cleveland, Dayton, Detroit, Indianapolis, New Haven, New York, Philadelphia, Rochester, Toledo, and Toronto, Canada. West Coast Representatives: Moore Machinery Co., Los Angeles and San Francisco; Star Machinery Company, Seattle. Other dealers in United States cities and throughout the world.

BLISS

ON YOUR PRESS IS MORE THAN A NAME...IT'S A GUARANTEE!

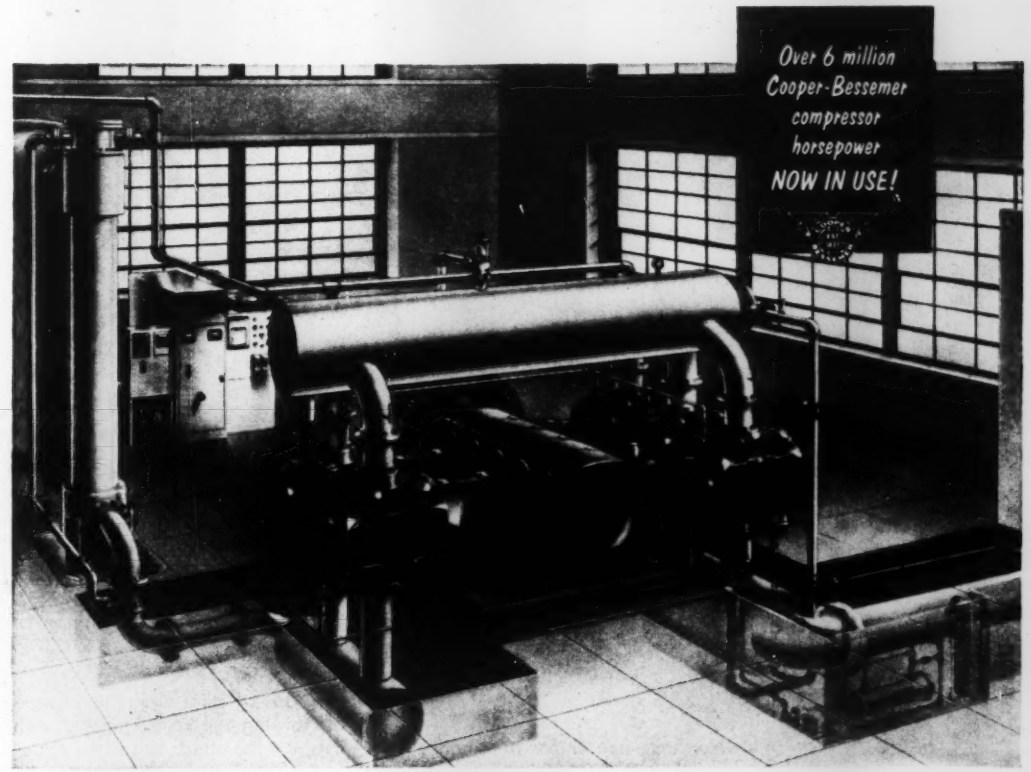

1 AUTOMATIC FEED
2 STOCK IS HEATED
3 STOCK DELIVERED TO CECOMATIC CONVEYOR
4 ROUGH FORGED IN FIRST IMPACTER
5 FINISH FORGED IN SECOND IMPACTER
6 SPRUE IS CUT OFF
7 CHUTES DISCHARGE FORGING AND SPRUE

A new method for the automatic mass production of "drop forgings" is announced by Chambersburg Engineering Company.

The method is called Impacting; the process (illustrated above) the Cecomatic Forging Process.

The Chambersburg Impacter, a new and unique type of hammer, is the basic tool of Cecomatic Forging.

CHAMBERSBURG ENGINEERING CO. • CHAMBERSBURG, PA.



Recommended setup

FOR SHOP AIR AT LOWEST COST!

THE above illustration shows a modern air compressor installation completely equipped with controls capable of functioning efficiently under all plant air requirements.

This opposed-action unit is one of the latest Cooper-Bessemer motor-driven compressor designs and is rated 1,000 hp, delivering 5,000 CFM at 100 lbs. operating pressure. The Cooper-Bessemer opposed-action design contributes to space-saving compactness, vibration-free operation and long life. Note also that in this setup pulsation dampers are located on all suction and discharge lines, and that all controls are localized on a single panel for maximum compactness and convenience. Finally, space requirements, piping and line losses are minimized with a single overhead intercooler.

Whatever your requirements for air, Cooper-Bessemer engineers will be glad to work with you and help you come up with *more air . . . in less space . . . at lowest cost.*

The Cooper-Bessemer Corporation

MOUNT VERNON, OHIO — GROVE CITY, PA.

New York • Chicago • Washington • San Francisco • Los Angeles • San Diego • Houston • Dallas • Odessa • Pampa • Greggton • Seattle • Tulsa • St. Louis • Gloucester • New Orleans • Shreveport
Cooper-Bessemer of Canada, Ltd., Halifax, N. S.

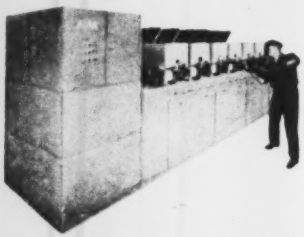
DIESELS • GAS ENGINES • GAS-DIESELS • ENGINE-DRIVEN AND MOTOR-DRIVEN COMPRESSORS • HIGH PRESSURE LIQUID PUMPS

Where Production And Precision Count

AUTOMOTIVE FORGINGS

CONNECTING RODS

PINION BLANKS



New Ajax-Northrup heater for automotive work has 8 heating stations, 30 interchangeable heating units. Heats billets from one to four inches, rounds or squares, to 2250° F at rate of 7500 to 8500 pounds per hour.

TRANSMISSION GEARS

AXLE SPINDLES

USE AJAX-NORTHRUP INDUCTION HEAT

Here's proof of Ajax-Northrup's ability to do the *tough* jobs . . . long run, high speed forging to exacting specifications.

The *connecting rod* billets are press-forged to a tolerance of 2 ounces. Smaller billets and elimination of scale give steel savings up to 20%. Production is increased 40%.

Ten tons of steel a day are saved by forging the *axle spindles* with improved methods based on scale-free induction heat. 16 men do the work of 46, and better fiber flow increases fatigue resistance of finished forgings by 17%.

The story's the same for gears, shafts, and countless other Ajax-heated forgings: Better forgings, at lower overall costs, with less steel. Call on our 35 years of induction heating experience—write us today.

SEND FOR NEW INDUCTION HEATING AND MELTING BULLETIN

133

FOR HEATING AND MELTING

AJAX NORTHRUP

AJAX ELECTROTHERMIC CORPORATION

AJAX PARK
TRENTON 5, NEW JERSEY

Associate Companies

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AJAX ELECTRIC FURNACE CORPORATION
AJAX ELECTRIC COMPANY, INC.
AJAX ENGINEERING CORPORATION

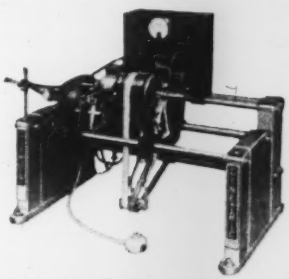
the final *check* for every rotating part...

Maybe it's a crankshaft or an armature . . . perhaps a fan or a belt pulley. No matter. The important thing is this: If it isn't *balanced,* it isn't ready for service.

Smooth operation and long life require that accurate static and dynamic balance be rated right along with mechanical specifications . . . incorporated in the blueprints. Then, no vibration, however slight, may lower the efficiency of the finished product.

Gisholt Balancing Machines can locate and measure unbalance vibrations down to .000025" with simple readings . . . handle any assembly from ½ ounce to 50 tons.

The cost? Very moderate. That's why so many manufacturers insist that their products have the final check which only Gisholt Balancing Machines can provide.



Gisholt Balancing Machines, made in a variety of sizes and types, can also be furnished with correction equipment designed to meet your specific requirements.

THE GISHOLT ROUND TABLE *represents the collective experience of specialists in the machining, surface finishing and balancing of round and partly round parts. Your problems are welcomed here.*

GISHOLT MACHINE COMPANY
Madison 10, Wisconsin

DYNETRIC BALANCERS — GISHOLT — DEVELOPED JOINTLY WITH WESTINGHOUSE ELECTRIC CORPORATION. DYNETRIC IS A TRADE MARK REG. U. S. PAT. OFFICE BY WESTINGHOUSE ELECTRIC CORPORATION

TURRET LATHES • AUTOMATIC LATHES • SUPERFINISHERS • BALANCERS • SPECIAL MACHINES

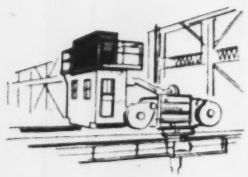
only at **DRAVO** can you get . . .

a **COMPLETE LINE** of

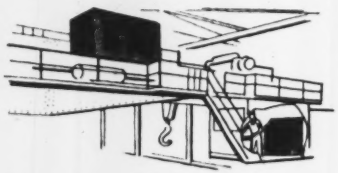
CRANE CAB COOLERS AND CONDITIONERS

No matter what radical temperature variations or atmospheric conditions occur in your industry, there's a Dravo Crane Cab Cooler or Conditioner available to protect your crane cab operator, safeguard his health, increase his efficiency and alertness and improve safety and production records in your operations.

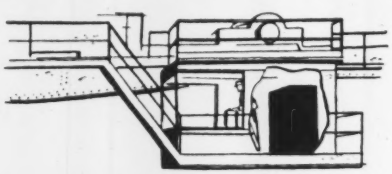
Dravo Crane Cab Coolers and Conditioners provide complete air conditioning, filter the air, remove dusts, dirt and fumes; heat the cab in winter, cool it in summer and provide constant ventilation the year around.



SELF-CONTAINED COOLERS—mounted alongside the cab or on the cab roof. Only electrical leads and connections required. Thermostat control—fully automatic—maintains 85° F. temperature with ambient temperatures up to 175° F. Ideal for "hot spots" in steel and other metal-working industries.



SPLIT-TYPE COOLERS—installed on the crane in two sections—the heavy condenser unit *on the crane* wherever you want it—the light cooling section *in the cab* with the operator. Two sections joined only with refrigerant pipe and electrical connections.



SMALL HEATERS AND VENTILATORS—especially designed to filter dusts and dirt, remove fumes, provide constant ventilation, supply heat in winter. Ideal for cranes in quarrying, slag, cement and similar industries.

One Source of Supply—Easy Installation

Dravo is your *one source of supply* for all crane cab coolers and conditioners. Units are quickly and easily installed with a minimum of downtime required. Parts are interchangeable on all units.

Available for Immediate Delivery

No delays in getting the units you want. For more information write for a complete catalog or phone your nearest Dravo sales office and have our representative call on you.

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strip steel by WEIRTON

Cold-rolled strip steel is made by Weirton to satisfy the most exacting requirements of its users. Superior equipment and methods, along with complete control of materials from mine to finished strip, assure the remarkable uniformity for which Weirton is noted.

Weirton customers enjoy *two* important advantages—the uniform quality of Weirton steel, and the dependability of Weirton service. In short, Weirton makes good steel and gets it to you.

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HIGH SIGN FOR STEEL PIPE

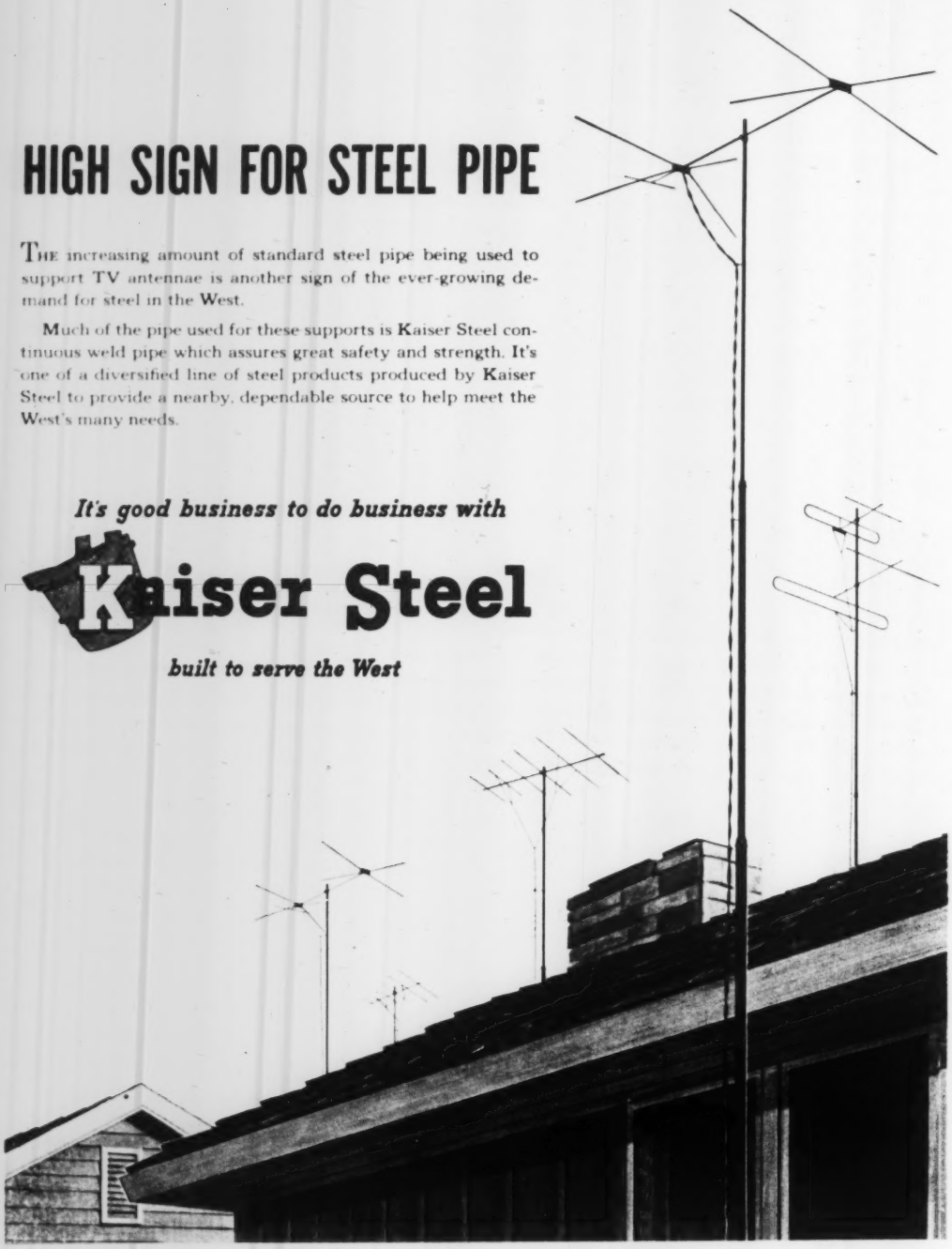
THE increasing amount of standard steel pipe being used to support TV antennae is another sign of the ever-growing demand for steel in the West.

Much of the pipe used for these supports is Kaiser Steel continuous weld pipe which assures great safety and strength. It's one of a diversified line of steel products produced by Kaiser Steel to provide a nearby, dependable source to help meet the West's many needs.

It's good business to do business with

Kaiser Steel

built to serve the West



PROMPT, DEPENDABLE DELIVERY AT COMPETITIVE PRICES • plates • continuous weld pipe • electric weld pipe • tin plate • hot rolled strip • hot rolled sheet alloy bars • carbon bars • structural shapes • cold rolled strip • special bar sections • semi-finished steels • pig iron • coke oven by-products
For details and specifications, write **KAISER STEEL CORPORATION, LOS ANGELES, OAKLAND, SEATTLE, PORTLAND, HOUSTON, TULSA, NEW YORK**

No ONE chain serves every purpose

LINK-BELT offers the right chain

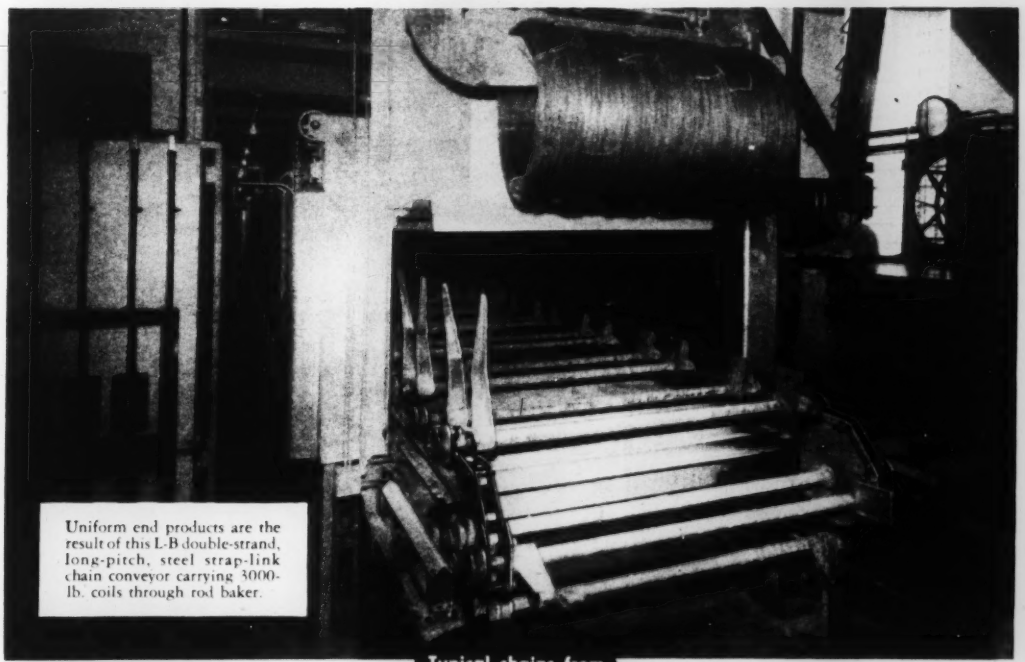
. . . engineered for your requirements

Don't settle for a "cure-all" chain to handle every job. Different types of chain have different characteristics. That's why Link-Belt makes a complete line of chains. Our engineers can recommend the correct type of chain to fit your particular needs . . . the one that does your job best.

Equally important is your assurance that *any* chain with the Link-Belt name will give you longer chain life. Accurate control of raw materials and processes . . . plus manufacturing refinements add up to the highest standards.

LINK-BELT COMPANY: Chicago 9, Indianapolis 6, Philadelphia 40, Atlanta, Houston 1, Minneapolis 5, San Francisco 24, Los Angeles 33, Seattle 4, Toronto 8, Springs (South Africa), Sydney (Australia). Offices, factory branch stores and distributors in principal cities. 12,791

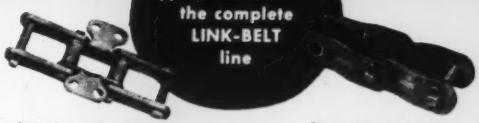
LINK-BELT
CHAINS AND SPROCKETS



Uniform end products are the result of this L-B double-strand, long-pitch, steel strap-link chain conveyor carrying 3000-lb. coils through rod baker.

Typical chains from the complete LINK-BELT line

Class SS bushed roller chain with straight sidebars—for practically any conveying or elevating service.



Class C combination chain—popular, durable, low cost design for elevators and conveyors.

Class SS bushed roller chain with offset sidebars—for heavy drive service at moderate speeds.

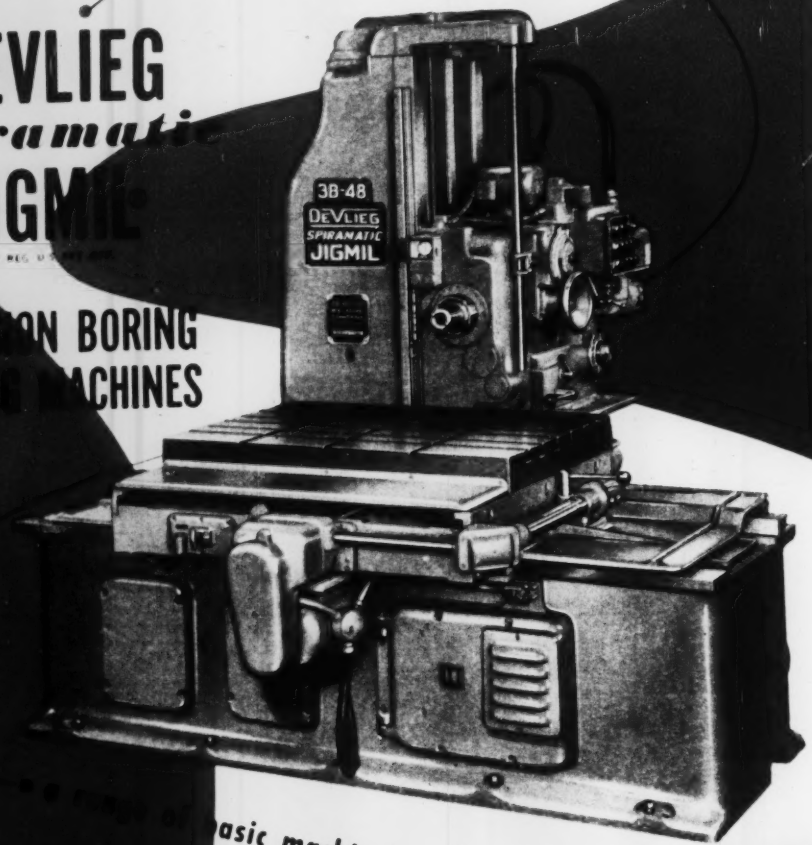
Transfer chain with tilting dogs—for plate and slab travel, loads up to 300,000 pounds.

DEVLIEG

Spiramatic

JIGMIL®

PRECISION BORING
and MILLING MACHINES



...asic machines
... boring and milling

for the latest developments in precision boring equipment . . . consult

DEVLIEG of DETROIT

DEVLIEG MACHINE COMPANY • 450 FAIR AVE., FERNDALE, DETROIT 20, MICH.

EASY TO READ

EASY TO OPERATE

And you get long, *accurate* service with these Fairbanks-Morse built-in advantages.

Fairbanks-Morse Dial Scales speed weighing because they're designed for easiest reading. The weighmen can read the correct weight at a glance. Even with drop weights applied, weights are still read right at the point of the indicator . . . no mental calculations are required. It's easier . . . faster . . . more accurate. Human errors are eliminated.

Check these features that mean fast, accurate weighing, with your Fairbanks-Morse weighing expert or write Fairbanks, Morse & Co., 600 S. Michigan Ave., Chicago 5, Ill.

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FAIRBANKS-MORSE

a name worth remembering when you want the best

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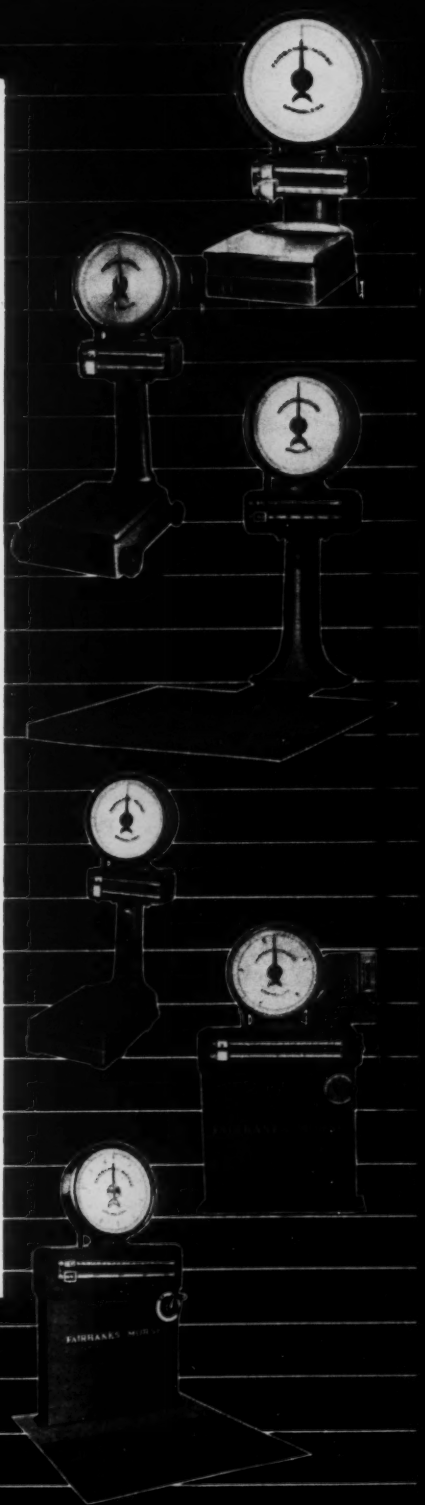
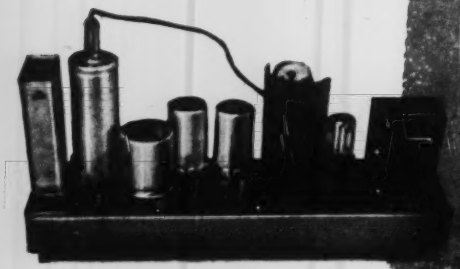
PUMPS • HOME WATER SERVICE EQUIPMENT • RAIL CARS
FARM MACHINERY • MAGNETOS



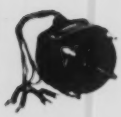
A lot of Engineering for an Amplifier, but...



Good engineering shows in this Amplifier's wide range of sensitivities, and of impedances, thorough filtering and plug-in connection to the rest of the Speedomax instrument

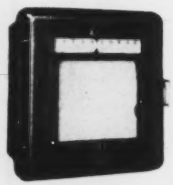
Good engineering shows in this Converter's phenomenally low noise level and in its long lived performance

Good engineering shows in this Slidewire's non-inductive winding and in absence of any flexible leads, which might form inductive loops



Good engineering shows in this balancing motor's small size, and in its torque ample to operate accessory control and signalling fitments

it helps Speedomax to fit your ideas!



• Your needs and ideas put this electronic "tool" to work on an amazing variety of jobs. Controlling furnaces and peering into atoms; counting bottles and spying on the weather; taking the "shine" out of rayon or putting it on hardware, to name six out of thousands of uses. For, in general, if you can feed Speedomax a tiny electrical signal, representing the condition you wish to measure, the instrument will not only put "calipers" on it, but will amplify it enormously to direct anything that can be directed through electrical or pneumatic means.

The Speedomax way of handling this job provides particularly accurate results and an especially good fit in meeting your individual ideas. For instance, there's the matter of receiving the signal in a way suited to its size—or, more usually, to its smallness.

We have no less than twenty-three carefully-engineered Speedomax Amplifiers covering a wide range of sensitivity and impedance levels. One Amplifier in the series enables the Speedomax to respond to a signal of only 10-16 watt—one ten-billionth of a microwatt. No other recorder amplifier comes within 3 magnitudes of this figure. Such sensitivity means corresponding accuracy in detecting the tiny unbalance—called "error" by circuit engineers—which actuates the rebalance system.

In terms of power, all 23 Amplifiers deliver the same—5 or 6 watts. This is from 2 to 4 times the output of other recorder amplifiers; permits a more powerful balancing motor. And the Amplifier-Motor team provides an especially high torque gradient just where it's needed—centering around the balance point—for prompt, positive balancing and easy, effortless operation of a "heavy" load of control or signal devices in the motor shaft.

The Speedomax story for industry is told in Catalog ND46(1); for Research, in Tech. Pub. ND46(1). We will send either on request; address our nearest office or 4957 Stenton Ave., Phila. 44, Pa.

LEEDS NORTHRUP

instruments • automatic controls • furnaces

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CAREER OPPORTUNITIES AT L&N

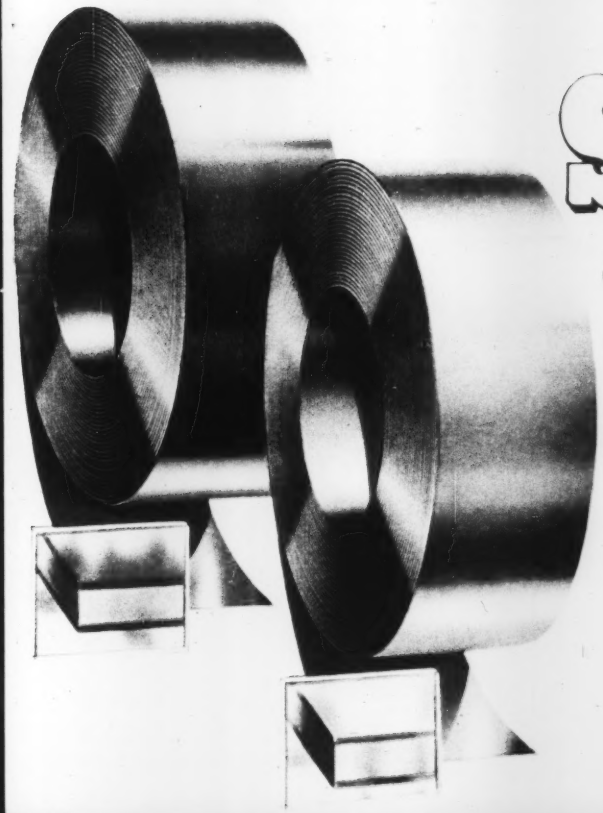
Expansion program of this long established firm has many features to attract outstanding recent graduates in engineering and science. Opportunities are in sales field engineering, product and application engineering, research, advertising, market development. Widely respected policies assure recognition of progress and achievement. Address Personnel Manager for preliminary interview at nearest of 17 L&N offices.

Help Yourself to Profit

WHILE YOU HELP SAVE

COPPER AND BRASS

FOR DEFENSE



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CLAD METALS

There's a two-way benefit in every coil of **SuVeneer** Clad Metals: profitable economy for you, and conservation of critical materials for defense.

The *solid* copper or brass on steel represents a saving of 70% to 80% over equivalent gauges of the single non-ferrous metals, and brings the inner strength of steel to your copper or brass product applications. The metals are bonded inseparably—you use your regular fabricating methods with this time-proved product. • Let us cooperate with you.

Superior Steel

CARNEGIE, PENNSYLVANIA

NOW... BETTER LONGER LASTING PROTECTION

...with new and improved TEXACO MEROPA LUBRICANT

For years, steel men have looked on *Texaco Meropa Lubricant* as the ideal protection for their enclosed reduction gears. Now — because Texaco engineers keep their eyes constantly peeled for ways of improvement — you can count on it to give even better protection.

First of all, the EP characteristics of *Texaco Meropa Lubricant* have been stepped up — and the increased protection lasts longer, as proved by Timken Test and actual field service. The new and improved *Texaco Meropa Lubricant* does not separate in service, storage or centrifuging. Its high EP is not affected by high operating temperatures. Its exceptional adhesiveness is not affected by moisture.

In addition, the new and improved *Texaco Meropa Lubricant* has greater-than-ever resistance to oxidation. It does not thicken in service, does not foam, and is non-corrosive to bearings. There is a complete line of *Texaco Meropa Lubricants* to assure longer gear and bearing life, lower maintenance costs.

Let a Texaco Lubrication Engineer help you get greater efficiency and reduce maintenance costs throughout your mill. Just call the nearest of the more than 2,000 Texaco Distributing Plants in the 48 States, or write The Texas Company, 135 East 42nd Street, New York 17, N. Y.

TEXACO Meropa Lubricants
FOR STEEL MILL GEAR DRIVES

Faithfully yours
50
for Fifty Years

TUNE IN TEXACO STAR THEATER starring MILTON BERLE on television Tuesday nights; METROPOLITAN OPERA radio broadcasts Saturday afternoons.

The Metalworking Outlook

December 1, 1952

Debate on Decontrol

At least one congressional committee favors the continuation of CMP "well into 1953." The Joint Committee on Defense Production bases that estimate on the effects of the steel strike and the supply situation in copper and aluminum, as well as the "requirements for a new and intensive stockpiling program." At the same time the committee wants the control agencies to set a program for decontrol so as to reduce to a "minimum government interference with the economic system." The report is just one more facet of the debate on decontrol which probably won't be resolved until General Eisenhower makes known his defense plans.

What About Wage, Price Curbs?

The resignation of Tighe E. Woods as price boss raises the question of whether there will be wholesale scrapping of price and wage controls before Jan. 20. Chances are they will not be dropped, although the temptation to the Truman administration to do so will be great. CIO pressure on Mr. Truman for decontrol is currently strong . . . Acting OPS director will be Joseph H. Freehill, Mr. Woods' former deputy.

Nickel: Tight as Ever

Yon can expect a continued tight supply situation in nickel. High-alloy nickel users have new military orders for some alloys they've never made before. To produce the material, they need more nickel, and most of it will probably come from allocations to other users.

Aircraft Output To Hold

Military aircraft appropriations should help bolster the economy until June 30, 1956, at least. Aircraft contracts already allocated for fiscal 1953 total $6.3 billion; for 1954, $5.8 billion; for 1955, $5.0 billion; and for 1956, $2.5 billion. From the start of the Korean War until the end of 1955, some 20,000 military aircraft will have been delivered. Production emphasis now is on bombers and heavier types.

Trend in Trucks

Watch for a continuing trend in the production of heavy trucks. In the weight class over 19,500 pounds, 89,793 vehicles were produced in the first nine months of 1951, compared with 113,507 for the same period this year. Two reasons are behind this trend: Demands of the military for heavy trucks and increasing truck transportation. The former may fade out as a factor, but the latter is not likely to. Some 133 billion ton-miles a year are now being hauled by trucks, more than double the volume of a decade ago.

Basing Points Again

The old basing point controversy will raise its ugly head this month again. The problem will come up in two December Federal Trade Commission decisions involving National Lead Co. and chain manufacturers. The majority of the FTC members are expected to outlaw basing points in the two cases on the grounds that they mean "con-

Production Engineering News p. 75 The Market Outlook p. 153

scious parallelism" in pricing. The lone dissenter: Lowell Mason.

Fresh Start for Labor?

George Meany's election to the presidency of the American Federation of Labor will not mean any great change in that organization's policies. Because of the long decline in William Green's health before his death, Mr. Meany had already been AFL president in everything but name for several years. But the CIO situation is different. If either of the two leading contenders, Walter Reuther or Allan Haywood, get Phil Murray's job in a contest that formally begins today with the opening of the CIO convention in Atlantic City, expect marked changes. Mr. Reuther's viewpoints are to the left of Mr. Murray's; Mr. Haywood's to the right.

Power in the Northwest

The power situation in the Pacific Northwest is increasingly serious. The dry spell of the last three months has reduced stream flow to a point where power production is far below demand. The 10 per cent cut already invoked is not producing expected results, and further drastic action may be coming. Cold weather complicates matters because the stream flow is curtailed still more by mountain freezes.

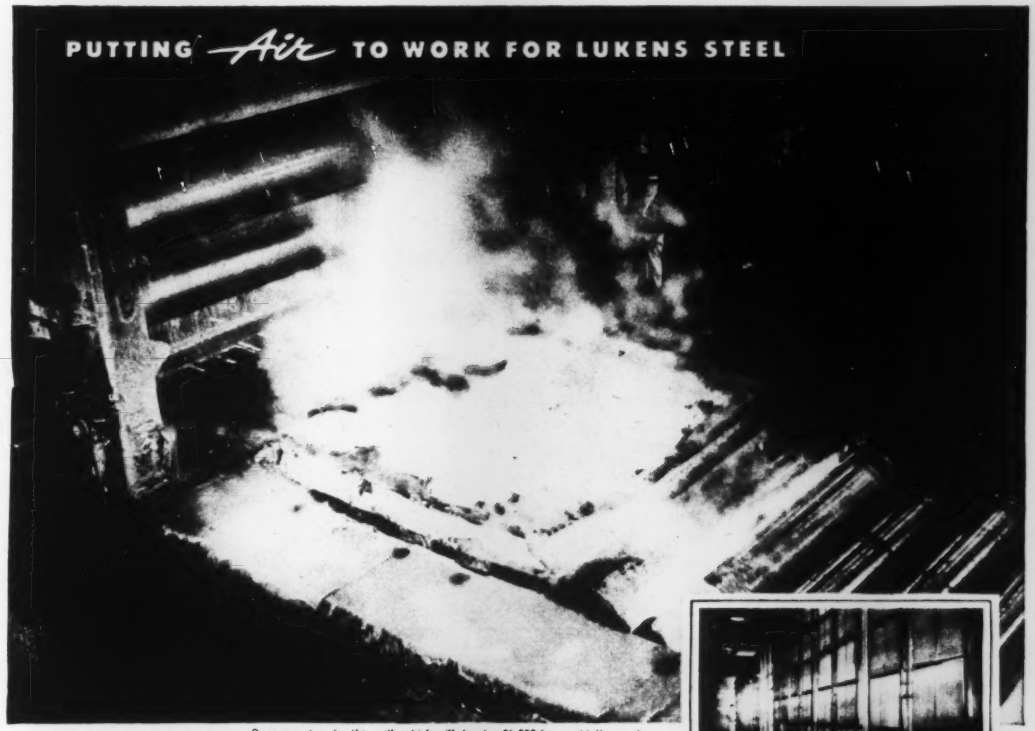
Straws in the Wind

Britain is pushing the long-studied plan for a $400 million project on the Volta river in the African Gold Coast to produce 210,000 tons of aluminum yearly . . . A $12.5-million aluminum sheet mill is planned for Connecticut by New Haven Smelting & Refining Inc., New Haven, Conn. . . . Jones & Laughlin Steel Corp. sold its four ore carriers to Wilson Transit Co. effective with the close of the shipping season . . . Hudson's new "Jet" will weigh only 2800 pounds, will have an engine of more than 100 horsepower, and will be shown publicly after the first of the year . . . The average work-week in mid-October was 41.5 hours, highest of any post-war month. It pushed average factory workers' pay to a new high of $70.80 . . . General Motors Corp. dropped the cost-of-living allowance from 26 to 25 cents per hour for its 315,000 hourly rate employees.

What Industry Is Doing

Alltime peak in scrap plus sufficient coke and ore could mean a record winter for steel production (p. 47) . . . Metalworking will be the best represented on the new presidential cabinet in 20 years as Messrs. Wilson and Humphrey receive posts (p. 48) . . . U.S. regulatory and investigating agencies—particularly the Federal Trade Commission—are up for investigation by the House Interstate & Domestic Commerce Committee (p. 49) . . . Office of Defense Mobilization sets the stage for shadow plants; plans for ten machine tool plants are firming up (p. 49) . . . Manufacturers of grinding wheels expect their second best production year in 1952 (p. 50) . . . Ford Motor Co.'s Cleveland Foundry sets an example for cleanliness, comfort and automaticity (p. 51) . . . The Air Force notifies contractors that it will pay a "fair share" of added production costs due to titanium (p. 52).

PUTTING *Air* TO WORK FOR LUKENS STEEL



Driving motors for this mill, which will develop 21,000 hp, couldn't operate for long without costly maintenance if they didn't "breathe" clean air

These PRECIPITRON units clean 200,000 cfm of ventilating air for Lukens' mill motor and control room.

Six AXIFLO® Fans develop steady pressure to draw air through PRECIPITRON, force it into motor room.

Five SILENTVANE® Fans draw the cleaned air through mill motors and generators to cool them.

ELECTRONS SCRUB THE AIR FOR BIGGEST PLATE MILL

Over in Coatesville, Pa., Lukens Steel Company operates the biggest steel plate rolling mill in the country. This behemoth swallows 55-ton ingots and spews them out as plates up to 195 inches wide. Electrical equipment driving the rolls is as big and tough as the job demands. Yet dirt particles so small you can't see them can bring the whole operation to a standstill.

How? Minute airborne particles build up on windings—cause overheating, fire or electrical failure. Answer? Westinghouse PRECIPITRON® for electronically cleaning the motor ventilation air. This electronic air cleaner takes over where other air cleaning devices give up. It is so efficient it traps even the microscopic particles that make up smoke.

This efficient electronic air cleaner—PRECIPITRON—has meant remarkable operational savings in many ways to industrial plants, commercial buildings, laboratories—even homes. You'll find it worthwhile to see if Westinghouse can help you *put air to work*, too—with air cleaning, air conditioning or air handling. Call your local Sturtevant office, or write Westinghouse Electric Corporation, Sturtevant Division, Hyde Park, Boston 36, Massachusetts.

YOU CAN BE SURE...IF IT'S

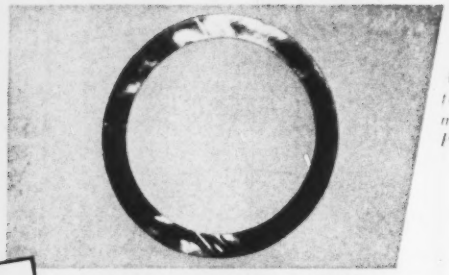
Westinghouse

J-80239

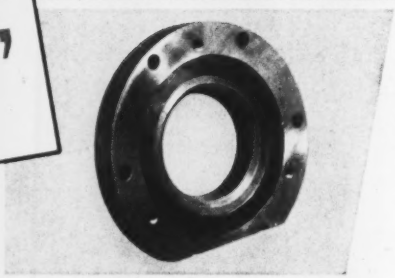
"17-7 PH"

Replaces Carbon Steel In These

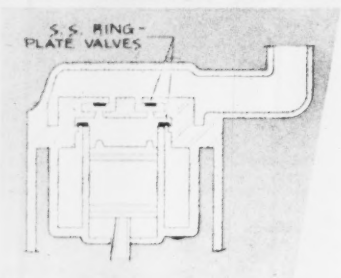
Ring-Plate Valves



A ring-plate type valve for freon compressor made of Armco 17-7 PH Stainless Steel strip.



Here is how the ring-plate type valve is mounted and held in its retaining plate.



This is the way the simple and efficient ring-plate valves operate in the compressor.

In a well-known line of freon compressors, Armco 17-7 PH Stainless Steel has proved its superiority for ring-plate valves and now replaces the carbon steel formerly used.

For these rings Armco 17-7 PH strip, 0.040-inch thick, is purchased in the cold worked condition. After blanking, only a single low-temperature heat treatment is required for the desired hardness, since cold working has already transformed the material. Resulting yield and tensile strengths are very high.

This is another case where physical characteristics and low-temperature heat treatment of this precipitation-hardening stainless steel produce a better product in fewer operations. Line check valve plates and pump valve discs are among other related applications that have been found most successful.

Two PH Grades

Armco 17-7 PH is made in sheets, strip, plates, bars and wire. Single and double low-temperature heat treatments are employed in hardening. There is also a special bar and wire grade, Armco 17-4 PH, that requires only a single low-temperature heat treatment. If you need good corrosion resistance and high strength combined with ready workability, investigate these two Armco Precipitation-Hardening Stainless Steels. Just a post card will bring you complete information.

ARMCO STEEL CORPORATION

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Challenging Role

History is being written by the briskness and auspicious circumstances under which the supervision of the United States government is being shifted from the outgoing to the incoming administration. The speed with which President-Elect Eisenhower is selecting members of his cabinet is unprecedented. The co-operative attitude of outgoing President Truman is in welcome contrast to the refusal to co-operate by incoming President Roosevelt 20 years ago.

As this is being written, General Eisenhower has selected seven of the nine members of his cabinet. It is significant that two of the seven are from the metalworking industry. George M. Humphrey, chairman of the M. A. Hanna Co., is Ike's choice for the important job of secretary of the treasury. Charles E. Wilson, president of General Motors Corp., goes to the likewise important post of secretary of defense. It is doubtful whether any previous cabinet has had as strong a representation from American industry as will that of the forthcoming administration.

Everybody in the metalworking industry will applaud those appointments. It is reassuring to feel that men who know industry's problems thoroughly will have a strong influence in the new government. However, exultation on this score must be tempered by the sober realization that these appointees will be confronted with exceedingly difficult problems. The nation cannot forget that the work of William Knudsen of General Motors under President Roosevelt and that of Charles E. Wilson of General Electric under President Truman was quite effectively sabotaged by the anti-business hatchet men of Washington.

Fortunately Messrs. Humphrey and Wilson will assume their duties under circumstances much more favorable than those which greeted Knudsen and General Electric Wilson. They go in with cabinet rank, which provides better protection against sniping than is afforded by the rating of an agency head. Most important is that unlike Roosevelt and Truman, who did not understand or trust businessmen, Eisenhower understands them and has confidence in them.

We're off to a fresh start. Humphrey and Wilson are in the challenging role of appointees to important government office who have a wonderful opportunity to restore the public service of businessmen to high esteem.

E. C. Kreutz

EDITOR-IN-CHIEF

EXCITING UNDERTAKING: This week's "cover" story (p. 76) deals with the ambitious heavy press program sponsored by the U. S. Air Force. It involves the building of 17 forging and extrusion presses ranging in size from 8000 to 50,000 tons and engineering work on a 25,000-ton extrusion press and a 75,000-ton forging press. The work has been assigned to

six press contractors and the presses will be placed in the plants of seven fabricators.

The program is exciting. The very size of the components of the presses introduces problems of design, production, transportation, assembly and erection never before encountered in this country. The pressures under which they will operate present new challenges for materials, controls and operating techniques. Although these mammoth machines are being built primarily to increase air-frame construction for jet and turbo-jet planes, once they are available for use it may be found that they will revolutionize the method of forming materials for certain civilian capital and consumption goods.

The heavy hydraulic press program is one of the most important projects American engineers have tackled in decades.

NEW IDEA IN FORGING: Something new in the forging of small parts has been developed by Chambersburg Engineering Co. Its new forging machine, called an "impacter" (p. 89), is essentially a horizontal drop forge on which both dies are moving dies. Rams which carry the dies move toward each other at a uniform speed. Stock is positioned in the impact plane in which the dies collide. Thus the workpiece is struck from two sides simultaneously.

Advantages claimed for "impacting" are better grain flow in the forging, less energy required for the forming operation and imperceptible vibration of the machine. Currently some of the first impacters built are engaged in rough forging and cold coining jet engine blades.

FOR RAPID WRITE-OFF: A retired investment banker now serving the government in the Defense Materials Procurement Agency thinks that fast depreciation should become a permanent policy. He argues (p. 54) that industrial expansion is financed out of earnings and savings by corporations and individuals. In recent years high taxes have seriously reduced the funds available from this source. "Twice in 12 years we were faced with necessity for large industrial expansion. Each time we met the need successfully by allowing fast depreciation on a temporary basis. Isn't it time to learn from this experience by adopting fast depreciation as a permanent policy?"

Opposition to rapid depreciation stems from persons who believe or pretend to believe it favors industry at the expense of Uncle Sam's tax collections. It should not be too difficult for businessmen to prove that in the long run rapid depreciation will increase rather than reduce tax revenues.

* * *

HENRY WOULD APPROVE: If Henry Ford were alive he would highly approve the new Cleveland foundry of Ford Motor Co. because it embodies ideas that were close to his heart: efficiency and cleanliness. Remember when a car dumper was installed at River Rouge and Henry, observing the cloud of dust arising from a dumped car, peremptorily ordered that the dumper be enclosed in a building?

The new foundry (p. 51) is efficient and clean. The ventilation system accounts for 15 per cent of the cost of the plant. The cleaning department is air-conditioned. Throughout the plant the air is clean, temperatures are comfortable and sand bugaboo in many foundries is so contained in pneumatic conveyors that it presents no housekeeping problem at all! Foundry engineers and equipment manufacturers have pooled their skills to make the Cleveland Ford facility the last word in foundry achievement.

* * *

NEW CONVEYOR MARKET? Proposals to carry pedestrians on underground conveyors in two cities raise the question as to whether or not this mode of transportation may help to solve the problem of sidewalk traffic congestion. The New York City Board of Transportation has proposed that conveyors be installed in the existing subway under East 42nd street to carry passengers 2300 feet between Times Square and Grand Central Station. Recently the chairman of the Cleveland Transit System recommended that a 3300-foot conveyor be installed in an underground passageway to be built under part of the downtown section.

Representatives of Goodyear Rubber Co. and Stephens-Adamson Mfg. Co. (p. 58) have developed plans for a type of conveyor system that would fulfill these requirements. If the idea of underground moving platforms should gain acceptance somewhat in the way that escalators have won popularity in recent years, a new market for steel, aluminum, motors, control apparatus, rubber and other materials and parts will have been created.

V CHECK Firestone FIRST FOR FAST, LOW COST METAL STAMPINGS

FIRESTONE'S modernized metal stamping plants are geared for speedy, low-cost production of those heavy, large-size stampings and assemblies now so badly needed for aircraft and ordnance equipment and accessories. Assembly operations, closely integrated with latest-type presses provide fast, efficient, straight-line production methods.

It will pay you to figure with Firestone. For a complete cost analysis write to Firestone Steel Products Company, Metal Stampings Division, Akron 1, Ohio.

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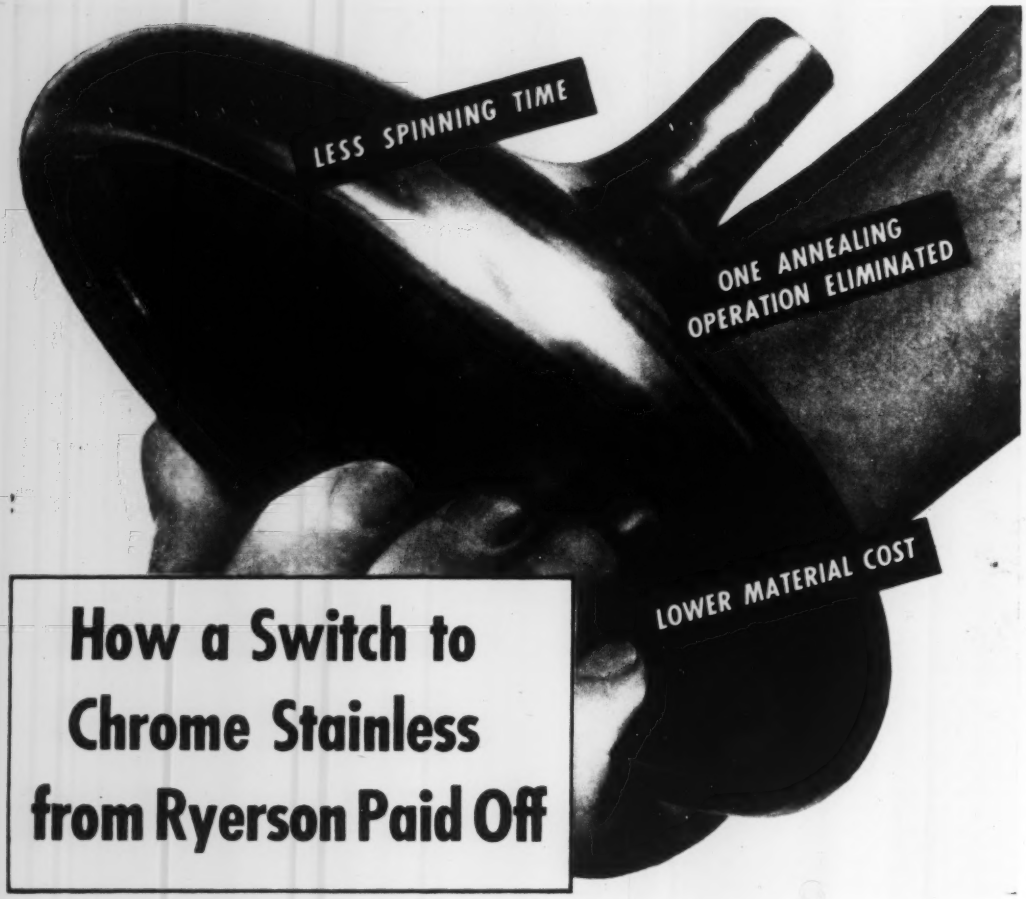

How a Switch to Chrome Stainless from Ryerson Paid Off

Here's how a Ryerson customer kept his business going when NPA Order M-80 cut off his supply of nickel-bearing stainless. This manufacturer was turning out vacuum tops for coffee dispensers. He was using Type 305 nickel-bearing stainless in his product—thought 305 was the only steel for the job. Restrictions on nickel meant discontinuing production or finding an alternate material.

In his search for an alternate, our customer tried Allegheny Type 430 straight chrome stainless from Ryerson stocks. Results were excellent. The straight chrome steel proved more than just acceptable—it did the job in less time, for less money. Because Type 430 work hardens less rapidly, spinning time was substantially reduced and an annealing operation eliminated. And Type 430 satisfactorily met the finish requirements while costing considerably less than the Type 305 it replaced.

• • •

Perhaps Type 430 or some other straight chrome stainless can solve a problem for you. Only a thorough investigation will tell. We are prepared to help you make that investigation—our staff of stainless specialists is at your service. And we are able to supply the needed steel—our stocks of straight chrome types are the nation's largest and most diversified. Since relief from the nickel shortage is still not in sight, we suggest you act now. Call your nearby Ryerson plant for quick action.

PRINCIPAL PRODUCTS: CARBON, ALLOY & STAINLESS STEELS—BARS, STRUCTURALS, PLATES, SHEETS, TUBING, MACHINERY & TOOLS, ETC.

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JOSEPH T. RYERSON & SON, INC. PLANTS AT: NEW YORK • BOSTON • PHILADELPHIA • CINCINNATI • CLEVELAND • DETROIT PITTSBURGH • BUFFALO • CHICAGO • MILWAUKEE • ST. LOUIS • LOS ANGELES • SAN FRANCISCO • SPOKANE • SEATTLE

SCRAP 6.8 MILLION TONS + **ORE** 51.0 MILLION TONS + **COKE** 2.8 MILLION TONS

Adequate Winter Steelmaking Stocks

Estimated raw material inventories for Dec. 1 are high—alltime peak for scrap and sufficient for coke and ore. That means a record winter steel ouput

WINTER STOCKPILES of metallics and coke are good, and steelmen hope to produce a record 39 million tons of ingots in the next four months.

Particularly welcome is an end to the decade of scrounging for scrap. Mill yards are piled high with a record 6.8 million net tons of the furnace fodder compared with 4.4 million tons Dec. 1 last year. Several of the larger mills have so much scrap on hand they are holding up shipments to cash in on present stocks before Dec. 31 so that their financial showing for 1952 is not too unbalanced scrapwise.

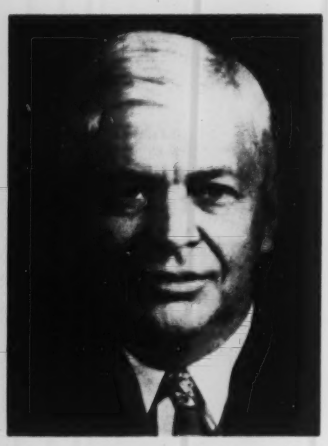
Scrap Exports? — The scrap drive has virtually been abandoned. Scrap dealers on the Pacific Coast collected such large quantities of scrap under the spur of NPA they are now faced with substantial losses because customers, when they buy, will buy only at under ceiling prices. The dealers are pushing for a relaxation of export regulations to permit them to get rid of their surplus at a profit despite demands of more steel capacity.

On the other hand, a few smaller mills in some areas are running on a relatively close scrap margin. In Detroit, many firms report scrap stocks of less than 30 days, while electric furnace, heavier open hearth grades and rail scrap are in high demand in many areas by large and small firms alike. But no one is predicting scrap shortages this winter. Most firms feel that diversion of scrap from the surplus areas coupled with rising pig iron output will carry them comfortably through the coming winter.

Chill Coming?—The one factor which could upset the steel diet is an unusually long and cold winter. Iron ore supplies for pig iron used in steelmaking are 51 million net tons now that the lake ore season draws to a close, compared with 54.9 million tons a year ago. The difference is due to the strike interruption. The supply will be adequate if a like amount of scrap can be fed to the steel furnaces until the shipping season starts next April. A hard winter, if it did not delay the start of the shipping season, would seriously hamper outdoor scrap collection as present inventories are used up in January and February. That could raise the need for pig iron in steelmaking to meet the deficit and put an added drain on the modest ore supply.

But it would take a mighty rough winter to produce that effect. And with coke supplies of 2.8 million net tons at producers' ovens now compared with 1.7 million tons a year ago, plus a serene labor picture and 6 per cent increased steel capacity over a year ago, more steel should roll off the mills this winter than ever before in history.

Pressure on Controls—The heavy



CHARLES E. WILSON
. . . GM's chief in the cabinet

winter output will unquestionably apply stronger pressure for the removal of controls. The steel companies will be pushing their plan for decontrol which involves: Immediate open-ending of CMP for steel, allowing mills to accept unrated orders after top-priority demands have been filled; starting Apr. 1, CMP allotments of steel only for military and AEC purposes; and starting next July 1, removal of virtually all controls on steel.

The plan is being discussed by Defense Mobilizer Fowler's Production Policy Committee today, Dec. 1, though final action on the proposal must wait until at least after Ike returns from Korea, possibly until after the inauguration on Jan. 20.

What's Behind Winter?—But the top question with steelmen is the possibility of a spring and summer chill in steelmaking. They have an expanded capacity that will reach 120 million tons sometime in 1953. That leaves them vulnerable to idle capacity with any easing off of the business level and civilian steel consumption. On the other hand, if there's a market for capacity production, they may have trouble getting pig iron and scrap to support it by the second and third quarters.

But the short term outlook is excellent. Now steelmen are wondering as winter comes if spring will find them far behind.

Portents of Change?

At least two members of Ike's cabinet have wide experience in industry

METALWORKING will be better represented on the new cabinet than it has been on any cabinet in 20 years. Representation will be in the persons of Charles E. Wilson, chosen by President-Elect Dwight D. Eisenhower for the post of secretary of defense, and George M. Humphrey, designated secretary of the treasury.

Mr. Humphrey, chairman of M. A. Hanna Co., Cleveland, brings to Washington financial experience gained in masterminding many of the wide Hanna holdings. He was instrumental in spurring the exploitation of Labrador iron ore deposits. He's been active in the activities of Pittsburgh Consolidation Coal Co., of which Hanna holds controlling interest, and has worked well with John L. Lewis.

Push From the Top—Mr. Wilson, possessing one of industry's liveliest imaginations, will give the job of defense secretary "the darndest whirl it ever had." It's likely that in this top policy-making spot he will push his dual-plant idea ahead.

Needed, he has said, is a long-term military-industry program which will make possible construction and or rearrangement of plant facilities to minimize the time-lag and duplication in shifting to all-out military production, civilian production or to combined operations.

More Ideas—Mr. Wilson's adventures into labor relations have provided the impetus to several innovations. During the last world war, under the threat of a manpower shortage, he advocated a 45-hour workweek. He's better known, perhaps, for the long-term agreement providing a cost-of-living escalator and "annual improvement factor" increases.

Undoubtedly, Mr. Wilson's vast knowledge of procurement operations of the country's largest manufacturing enterprise could be applied with good effect to military procurement policy.

The possibilities are numerous and, as one metalworking executive said, "Maybe now they'll get down to business in Washington."

HARLOW H. CURTICE
. . . new General Motors president

GEORGE M. HUMPHREY
. . . another voice for metalworking

Replaces Wilson at GM

Harlow H. Curtice, executive vice president of General Motors Corp., will take over as acting president of GM when C. E. Wilson leaves to become secretary of defense.

Mr. Curtice began his career with GM in 1914 as a bookkeeper for the A. C. Spark Plug Co., Flint, Mich., and became general manager, Buick Motor Division in 1933 and vice president in 1948.

Plants, Not Stockpiles

The Vance committee's interim report brings shadow plants one step closer to reality

A DOWN PAYMENT on added plant capacity to support allout production of military end items in fiscal 1954 was recommended by the Vance committee of the Office of Defense Mobilization last week.

That recommendation was contained in an interim report which confined itself to the policy decision to build capacity rather than to stockpile military end products and to the first small start towards getting capacity to take care of needs for the first year of an allout war.

Undecided Still—In general, the Vance committee finds present information insufficient to identify all areas in which additional production capacity should be provided. However, "there are programs now for expansion of production capacity for planes and engines which . . . should, in our opinion, be finally evaluated and when approved, should be proceeded with at once."

Starting with fiscal 1954, funds for production capacity expansion would be earmarked in the Defense Department budget. That has already been agreed by both Defense Secretary Robert Lovett and Defense Mobilization Director Henry H. Fowler. The suggested "down payment" is something under $1 billion, in addition to equipment now being produced to meet current mobilization needs.

Firming Up — A final report from the Vance committee is due about the end of the year. It's expected to contain definite recommendations for the construction of some "shadow plants" (for more on shadow plants, see Nov. 24, p. 73). In fact, plans for 10 such plants in the machine tool field are already firming. Some of the companies which will participate in the program have been picked and DPA is figuring out expenditures for equipment.

Defense Mobilization Order 23 is just out, and it also relates to shadow plants. It aims to fix various agencies' responsibilities for mobilization base programs.

Investigating the Investigators

Government agencies regulating industry will be scrutinized by a House committee. Purpose: To ascertain whether they've gone beyond powers delegated by Congress

TABLES WILL BE TURNED on government agencies charged with controlling the nation's business.

The House Interstate & Foreign Commerce Committee intends to call in the nine or more semi-independent agencies over which it has jurisdiction. It will ask them to justify "restrictions which have been imposed under the Democratic rule of the last two decades."

Hedging on Business — Rep. Charles A. Wolverton (R.-N.J.), who's slated to head the committee in the 83rd Congress, explains that while some of the agencies have done a good job, others "have hedged business and industry with so many facets of federal control, they have emasculated much of the traditional spirit of free enterprise." He hopes "loosening the throttle of over-restriction" will contribute to economic stability and end the current inflation.

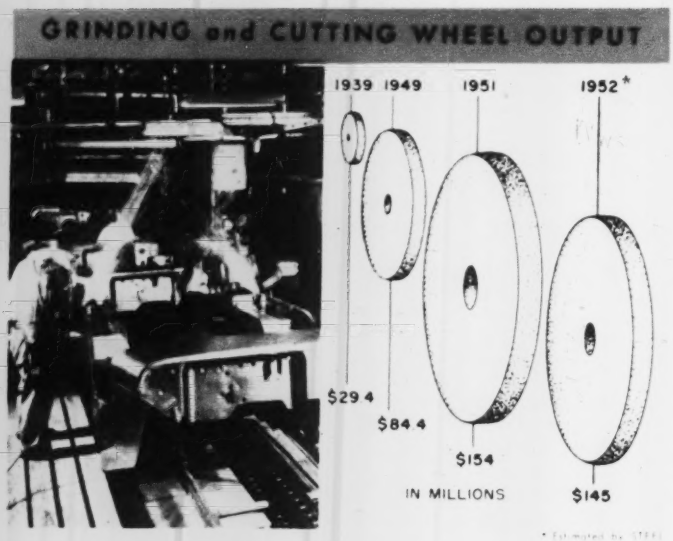
The investigation of the investigators will get one bit of help under reorganization plans initiated in the last four years, whereby many of the agencies will get new chairmen — designated by President-Elect Eisenhower. Almost the only agency controlling a segment of commerce or industry which still chooses its own chairman is the Interstate Commerce Commission.

Balance of Power—More aid for the new viewpoint stems from the fact that all of the independent agencies are bipartisan in character and, as the terms expire, the balance of power can be expected to shift from Democratic to Republican.

Agencies due for a going-over include: The Federal Trade Commission, Securities & Exchange Commission, Federal Power Commission, Interstate Commerce Commission, Civil Aeronautics Administration, Maritime Administration, Civil Aeronautics Board, Office of International Trade and Federal Communications Commission.

Selenium Goal Expanded

DPA announced an expansion goal for U. S. supply of selenium, including selenium metal, alloys and compounds in terms of selenium content, as 1.1 million pounds in 1955.



Wheelmakers Grind Out Production

Despite the common problems of materials shortages and the steel strike, grinding wheel manufacturers will have their second-best production year in 1952

GRINDING operations in industry are wheeling along at near-record rates this year, and should result in a $145-million production of grinding wheels.

That's about 5 per cent under 1951's alltime record of $154 million but still a comfortable second-best (see the chart).

Up and Up—For next year, optimistic wheelmakers, like A. J. Schneider, general sales manager, Sterling Grinding Wheel Co., Cleveland, see a "very bright" future with perhaps a "15 to 20 per cent rise in volume." Conservative members of the industry foresee nothing worse than production "about equal to 1952," and other manufacturers, including Bay State Abrasive Products Co., Westboro, Mass., look for "bright prospects for the next few years."

It hasn't been easy to keep sales up. The steel strike directly hit the wheelmakers' three big customers. The steel industry, automotive industry and foundries. Materials, such as bonding resins, cryolite and diamond bort, always seem difficult to get. Cost increases, particularly in transportation charges, could only partially be passed through. Foreign sales, for manufacturers who do not have foreign plants, were crippled by currency devaluation. In the case of the British pound the effect was a 50 per cent price increase for American tools overseas.

The Reason Why—How, then, can wheelmakers roll up near-record outputs and expect to equal or better them next year? Mainly through the everyday industrial miracle of improving production methods and new applications. Here are some examples:

Automatic grinding machines to clean surfaces of the engine blocks and heads in the automotive industry; multi-wheel installations for precision grinding, where a number of grinding operations can be performed at one time; segmental cut-off wheels permitting sizes up to 40 inches and reducing wheel changes; or better bonding methods and substitute abrasive agents.

Diamond Substitute?—Probably the most glamorous wheel activity has been the search for and development of substitutes for diamond bort, for nearly all bort must be imported. Result to date: Nothing quite up to diamond wheels, but improved silicon carbides will do the job in a little longer time. "Freeze grinding," using carbon dioxide as a coolant on the point of contact, holds promise of being another part of the answer.

Another reason for lack of dips in the grinding wheel industry's sales chart stems from the extreme versatility of the industry. There's "no distinction between defense and civilian buying as such," says Carborundum Co., Niagara Falls, N. Y. Thus, wheel sales can be maintained unless general industrial activity, defense and civilian, slows down.

Fifth for Direct Defense—Currently, about 20 per cent of wheel output goes directly into defense work and from 60 to 90 per cent is on DO-rated orders.

Perhaps the best indicator of how grinding wheel makers look at the prospects for American industrial activity is the wheelers' expansion program. Those manufacturers have expanded capacity about 30 per cent from pre-Korea levels and are prepared to grind up to 50 per cent more business in the future.

More Capacities To Expand

Annual production capacity of artificial graphite in 1953 is estimated at 332.4 million pounds and may climb to an annual rate of 352 million pounds by July 1, 1954, reports NPA. Those goals represent wide expansions over the industry's Jan. 1, 1951, capacity of 202.6 million pounds.

Carbon electrodes' annual production capacity in 1953 is estimated at 202 million pounds, reaching to 222 million pounds by the following year.

Artificial Graphite Producers Industry Advisory Committee told NPA that business is expected to climb in 1953; and that present inventories of manufacturers are in a safe balance for the industry and should not be reduced. The committee reported satisfactory progress is being made in facilities expansion programs, and NPA said no acute shortages were known in any sizes of artificial graphite at this time.

No smoke, dust and fumes in this hot-metal pouring operation at . . .

Ford's Foundry: Dream Come True

Ford Motor Co.'s Cleveland foundry operation sets an example for cleanliness, comfort and the nearest thing to complete automaticity

IMAGINE if you can a foundry where the air is clean, the temperature is comfortable, sand is nowhere to be seen, and every heavy flask or casting is moved by conveyor.

This is no dream. The Cleveland facility of Ford Motor Co. is such a foundry. The plant, which adjoins the municipal airport, and provides castings for the adjacent engine manufacturing operation is the most modern foundry in the world and among the world's largest.

Just as the engine plant (STEEL, Apr. 7, p. 99) is the most completely automated manufacturing facility in the automotive industry, so too is the foundry the nearest thing to an automatic operation which foundry engineers have been able to devise. The sand system offers an outstanding example.

Operation: Sand—Some 54,000 tons of sand is stored inside after being thoroughly dried as it comes out of railroad cars. The core sand is brought to muller hoppers by conveyor. Prepared core sand is delivered to core blower hoppers by pneumatic tubes, the control panel for this system looking for all the world like a layout of a railroad switching yard. Flashing lights representing mixers and points of use signal when sand is needed and when bins are full. The sand itself is never seen until the cores are blown and removed from core boxes.

The ventilation system of the plant alone accounted for 15 per cent of the total cost. It circulates 2.8 million cubic feet of fresh air per minute to keep working areas completely free of dust, smoke, fumes and excess heat. All air entering the plant is filtered, and the casting cleaning department is air conditioned.

Innovation—Among the foundry's innovations is the use of heat exchangers to recirculate the hot blast through the foundry's ten cupolas. Ordinarily the cupolas' heat would be lost up their stacks. Electrostatic dust collectors remove all objectionable particles from the cupolas' smoke. Two artificial lakes and additional sumps are used for the dust collection and refuse disposal system.

The foundry presently has four molding lines in operation, pouring gray iron for six-cylinder Ford engines. Now being installed are four additional lines to supply castings for Mercury's new V-8 overhead valve engine, which also will be manufactured at the Cleveland plant. In peak operation the foundry will be capable of turning out castings for 4600 engines a day, pouring 1400 tons of metal daily.

New Furnace for Steel & Wire

American Steel & Wire Division of United States Steel Co. has begun engineering work for construction of a new blast furnace to be built at the Central Furnaces & Docks plant in Cleveland.

The furnace will have a 1350-tons-a-day capacity.

SDPA Loans Hit $28 Million

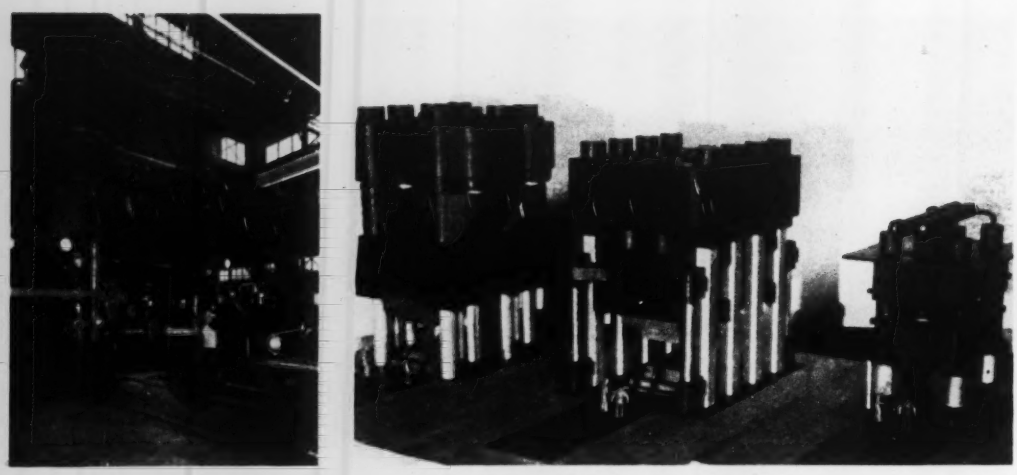
The Small Defense Plants Administration has made loans totaling nearly $28 million to date to assist 233 small firms in expanding their production.

SDPA says analysis shows most of the loans have gone to companies employing fewer than 100 persons. The major purposes of the loans recommended by SDPA and granted by the RFC are to provide working capital and expand or replace existing facilities.

New Pools Announced

Two more defense production pools have sprouted in widely separated sections of the U. S. The Small Defense Plants Administration, in announcing their formation, lists 20 pools now formed.

The newest pools are the Antico Pool, Brooklyn, N. Y., consisting of 29 small firms in metropolitan New York City and New Jersey, and Wisconsin Manufacturers' Defense Pool Inc., made up of eight companies in Milwaukee.



Heavy Presses Getting Heavier and Heavier at Alcoa

The picture at left, showing the 15,000-ton Schloemann hydraulic forge press now in operation at Aluminum Co. of America's Cleveland Works, is familiar to many persons in industry. Large as it is, by 1954, it will be small compared with the two presses now being built for Alcoa under contract with the Air Force. Models of the three presses are seen at right. From right to left are the German press, a 35,000-ton press and the biggest of all, a 50,000-ton press. Negotiations were completed on Nov. 28, and two Pittsburgh firms, Mesta Machine Co. and United Engineering Co., will build the two large units. They will be operated in Cleveland in a new plant which will cost the government about $40 million. For more about the Air Force press program, see page 76

Green Light for Titanium Aircraft

Despite the metal's high cost, the Air Force will encourage its increased use by accepting a "fair share" of the added expense. The Army and Navy will wait

AS PART of the program to crowd ten years' normal development into two, the Air Force has notified contractors of its willingness to accept a "fair share" of the increase in production costs resulting from use of titanium.

It already has signed up Convair, which will incorporate titanium in production quantities in B-36 planes and other builders will be using the metal "in quantities" soon.

Nudge — Through payment of premium compensation, the Air Force hopes that contractors will acquire the necessary fabricating know-how, so that greater use of titanium, at lower costs, can be made in airplanes of the future. Suppliers will feel the effect of the new program, because titanium will be required in the form of bolts and nuts, forgings, sheets, bars, etc., in various sizes and shapes.

To back up this program, a committee is being organized to provide contractors with all available information on fabricating techniques. Under the chairmanship of Col. Wilbur R. Carter, Air Materiel Command, Wright-Patterson field, the committee will serve as a general clearing house.

Air Force Won't Wait—While the Army and Navy have definite plans for using titanium in large quantities when the metal becomes obtainable at substantially lower prices than those now prevailing, the Air Force has taken the position that it cannot wait for lower prices particularly because a difference in cost of metal going into a plane represents only a slight difference in the cost of the completed plane.

Because of the low density of titanium, planes with higher speeds, greater maneuverability, longer range, and requiring shorter take-off distances, can be designed in this metal. Furthermore, titanium's high-temperature characteristics will permit speeds involving skin temperatures in excess of those that can be tolerated with today's conventional materials. The Air Force has gone so far with the titanium program that virtually

SELECTED DEFENSE CONTRACTS IN EXCESS OF $100,000

PRODUCT	CONTRACTOR
Lathes	Cross Co., Detroit
Trucks, Lift	Yale & Towne Mfg. Co., Philadelphia
Light Trucks	Willys-Overland Motors Inc., Toledo, O.
Construction Machinery	Oliver Corp., Chicago
Radio Sets	Radio Corp. of America, New York
Rifle Parts	Remington Arms, Bridgeport, Conn.
Aircraft	Republic Aviation Corp., Farmingdale, L. I., N. Y.
Aircraft Parts	Westinghouse Electric Corp., Pittsburgh
	United Aircraft Corp., E. Hartford, Conn.
Valves	Robertshaw-Fulton Controls Co., Youngwood, Pa.
Starters	American Bosch Corp., Springfield, Mass.
Regulators	Eclipse-Pioneer Div., Bendix Aviation Corp., Detroit
Actuators	Lear Inc., Grand Rapids, Mich.
Submarine Motors	Elliot Co., Jeannette, Pa.
Wrench Sets	Vichek Tool Co., Cleveland

CLIFFORD F. HOOD
. . . pres., U. S. Steel Corp.

HARVEY B. JORDAN
. . . U. S. Steel exec. V.P.

WALTER F. MUNFORD
. . . pres., AS&W

every part of an airplane is being considered for design in the metal.

Needed: More Output—To accomplish the titanium objective, larger production will be necessary. Present output is about 1200 net tons of titanium sponge per year. Under contracts placed by Defense Materials Procurement Agency with Titanium Metals Corp. and E. I. du Pont de Nemours Co., production of 7200 net tons in 1955 has been arranged. Under contracts now being negotiated by DMPA with Crane Co., Kennecott Copper Corp., Union Carbide & Carbon Corp. and Monsanto Chemical Co., the 1955 output will be increased to a total of 22,000 net tons. That figure may become even larger if certain other interested companies are brought to the contract stage.

CHECKLIST ON CONTROLS

Price Regulations

MACHINERY—Amendment 41 of CPR 30, issued Nov. 20, 1952, and effective Nov. 25, specifies that applications for approval of machinery and related goods manufacturers price lists revised after June 24, 1950, may be made when the revision is made for the sole purpose of changing differentials in discount structure and where no substantial changes in ceiling prices are affected.

METAL CANS—Supplementary Regulation 39 of CPR 22, Supplementary Regulation 126 of General Ceiling Price Regulation and Supplementary Regulation 2 of General Overriding Regulation 35, all issued Nov. 20, 1952, and effective Nov. 25, authorize a price increase of 4 per cent above the highest selling price between Jan. 1, 1952, and June 30, 1952, for manufacturers of metal cans.

PASS-THROUGH—Amendment 1 of General Overriding Regulation 35, issued Nov. 20, 1952, and effective Nov. 25, specifically bars the use of GOR 35 by steel, pig iron, copper and aluminum processers who are granted a metals cost adjustment under certain tailored regulations. It also relieves some manufacturers of the obligation to notify their customers of the amount of pass-through covering increased metals costs.

COKE CHEMICALS—Amendment 13 of Supplementary Regulation 13 of General Ceiling Price Regulation, issued and effective Nov. 13, 1952, authorizes a 3.75 per cent increase of ceiling prices for coke and coal chemicals produced in by-product coke ovens. It also grants producers of such products the privilege of passing through the increase on delivered cost of coking coal occurring after Oct. 1, 1952.

FERROCHROME—CPR 180, issued Nov. 24, 1952, and effective Nov. 25, establishes increased ceiling prices for producers of ferrochrome, chromium metal and other chromium products.

COMPRESSORS—Supplementary Regulation 1 of CPR 150, issued Nov. 26, 1952, and effective Dec. 2, authorizes manufacturers of small pneumatic compressors to raise their ceiling prices to reflect increases in outbound transportation costs occurring since Jan. 26, 1951.

TRANSPORTATION COSTS — Supplementary Regulation 1 of CPR 119, issued Nov. 26, 1952, and effective Dec. 2, authorizes manufacturers of mechanical precision springs, metal stampings and screw machine products to raise their ceiling prices to reflect increases in outbound transportation costs since Mar. 15, 1951.

REFRACTORY BRICKS—Supplementary Regulation 1 of CPR 125, issued and effective Nov. 26, 1952, authorizes an increase in ceiling prices of about 24 per cent for producers of refractory silica coke oven shapes or brick.

U.S. Steel Changes Officers

Five top-level appointments announced as corporation shifts executives

FIVE MAJOR changes in the top management of U. S. Steel Corp. were made at a meeting of the board of directors of the corporation last week. They were further steps in the merging of U. S. Steel Co. at the beginning of 1953 into the parent corporation as it becomes primarily an operating unit.

Clifford F. Hood was elected president of the corporation effective Jan. 1, and a member of the board of directors effective immediately. He also becomes a member of the finance committee. **Benjamin F. Fairless** will continue as chairman of the board and chief executive officer of the corporation.

Harvey B. Jordan was voted executive vice-president of operations of the corporation, effective Jan. 1 and **Walter F. Munford** was appointed president of the American Steel & Wire Division, effective Jan. 1.

Robert C. Tyson was elected vice chairman of the finance committee and a member of the board of directors and of the finance committee of the corporation. He will continue as comptroller, also.

Howard E. Isham was elected vice president and treasurer of the corporation effective Dec. 1, 1952. He succeeds Max D. Howell, retiring from these posts at the end of November.

why do

Windows of Washington

By E. C. KREUTZBERG *Washington Editor*

"Amortization Rate—Industry's Prerogative"

—Irving Gumbel

"A STATUTE to permit a manufacturer to construct, rehabilitate or enlarge his plant and equipment and charge the capital cost thereof for taxation purposes against his income at a rate to be determined by him at the time he undertakes the operation should be the next objective of businessmen."

That is the advice of one of the leading officials in the defense expansion program. Irving Gumbel. A retired investment banker, he is now serving as assistant administrator, General Services Administration, and assistant to administrator, Defense Materials Procurement Agency. Although not authorized to speak for the administration, Mr. Gumbel's personal views are based to a large extent on his government experience in promoting industrial expansion.

Reduced Savings — "Theoretically, under our capitalist system," Mr. Gumbel told STEEL, "industrial expansion is financed out of earnings and savings by corporations and individuals. In recent years, as a result of high taxes on income, the amount of savings for this purpose has decreased so it is impossible for industry to maintain its economic growth from that source.

"Twice in the past 12 years we were faced with necessity for large industrial expansion. Each time we met the need successfully by allowing fast depreciation on a temporary basis. Isn't it time to learn from this experience by adopting some fast depreciation program as a permanent policy?"

Good Business—"A program is required which will permit industry to continue its growth in size and efficiency. Moreover, the government should not set limitations on the amount of expansion which industry may undertake, nor should it make decisions between the requirements of different industries or different companies.

"The need for permanent fast amortization ties in with the general desire to keep business and employment at high levels. Permanent fast write-offs are necessary for all business, but particularly for small firms which now, because of high taxes, cannot afford to modernize."

Wanted: Medicine Men . . .

A lift to industrial medicine is to be provided by the Atomic Energy Commission in the form of eight fellowships to provide advanced training for physicians in this field. Awards, covering a year's expenses at institutions offering approved graduate courses in industrial medicine, particularly in relation to needs in the atomic energy industry, will be made by a committee headed by Dr. A. G. Kammer, medical director, Carbide & Carbon Chemicals Div., Union Carbide & Carbon Corp. Applications must be submitted by Jan. 1, 1953, to Dr. Henry A. Blair, University of Rochester, Rochester N. Y.

Cancellation Payment . . .

An amendment to provide for payment for unfinished work when machine tool pool orders are canceled is being drafted by General Services Administration. Similar to an arrangement recently adopted by the Defense Department for making settlements following cancellations, it provides 2 per cent profit on unprocessed materials and parts, 8 per cent profit on processed materials and parts, but the average profit on unprocessed and processed materials and parts is not to exceed 6 per cent.

Restores Trade Committee . . .

The Wholesale Trade Advisory Committee was put back into commission by Commerce Secretary Charles Sawyer. At the same time, the Commerce Department endorsed the program of the newly organized Office of Distribution.

The purpose of the reactivated Wholesale Trade group will be to counsel the Commerce Department in its defense and post-defense activity in behalf of distributive trades.

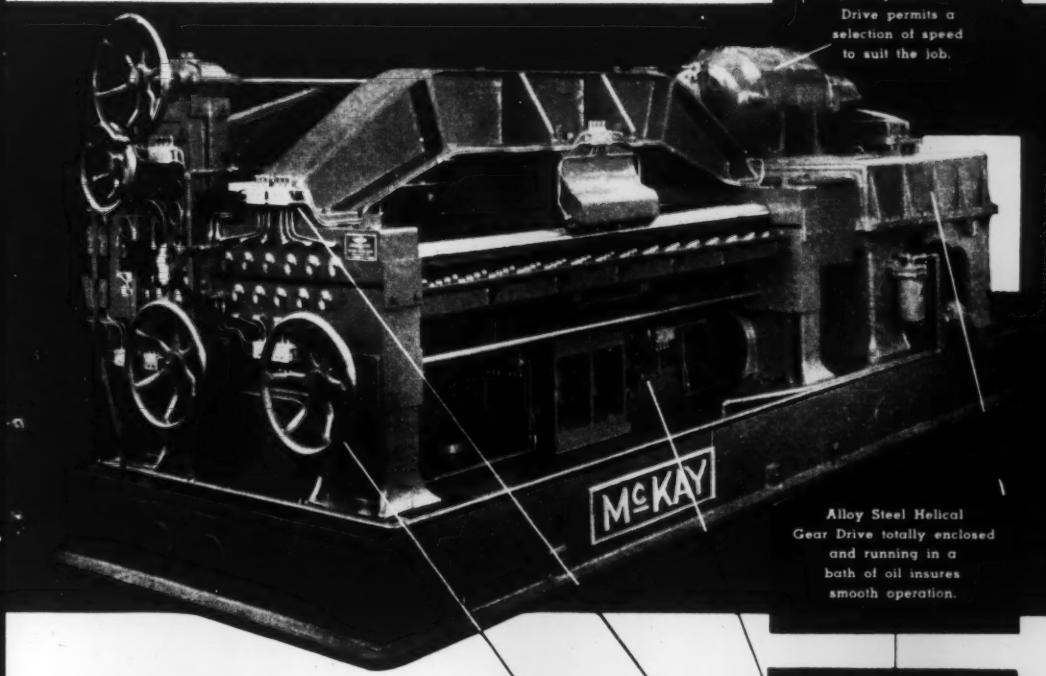
The Office of Distribution will foster a more efficient and effective distribution of goods, assemble and develop marketing information for better use by business, and collect basic data on distribution costs.

From Practice to Preach . . .

Willard L. Thorp has resigned as assistant secretary of state for economic affairs to become director of the Merrill School of Economics at Amherst College. During his seven years with the State Department he wielded a powerful influence in shaping up policy under the Point Four and Reciprocal Trade Agreements.

why do [redacted]

LAST LONGER ?



Multi Speed Motor Drive permits a selection of speed to suit the job.

Alloy Steel Helical Gear Drive totally enclosed and running in a bath of oil insures smooth operation.

[redacted]

One shot system provides correct lubrication for all moving parts.

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[redacted] The McKay Flex Roll Sheet Processor is universally accepted by the automotive and stamping industries for eliminating stretcher strain and reducing scrap loss due to breakage in die drawn parts. The Processor combines a deep flex rolling under tension and a thorough cold working of the steel sheet by roller leveling, to condition it for deep drawing operations.

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The **McKAY MACHINE** *Company*

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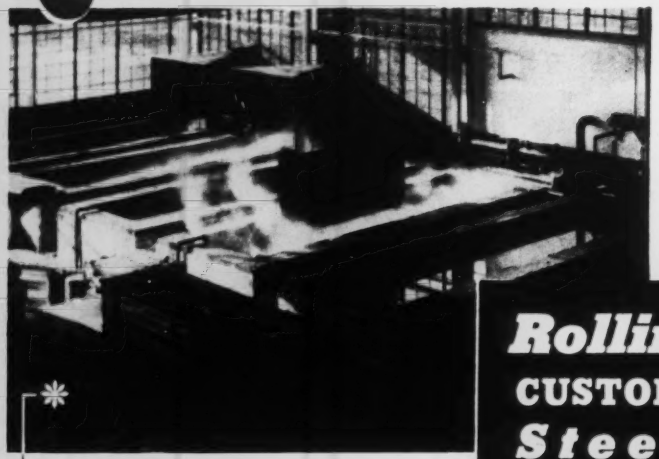
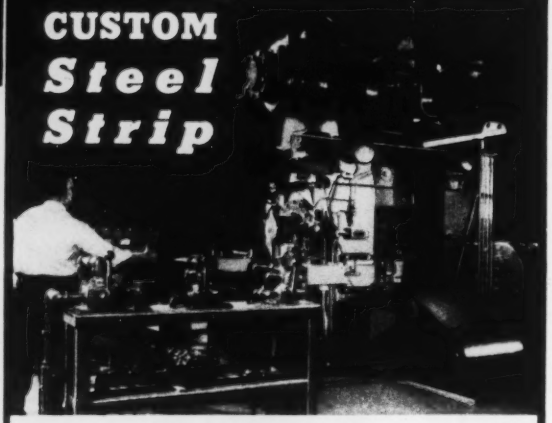


Rolling Our Own CUSTOM Steel Strip



Pickling tanks in our Seneca Buffalo warehouse are shown above. All 3 of our plants, Detroit, Chicago and Buffalo, are equipped with the latest type cross-ventilated tanks to give you fast delivery of pickled and oiled steel in sheets, plates, bars and coils (cut to length if desired).

- Roller leveling too, annealing, shearing, slitting and skin rolling.
- Steel strips in coils and cut lengths . . . restricted tolerances, all tempers and finishes.
- Warehouse stocks in sheets, plates, coils and cut lengths . . . all tempers and finishes.

For quick "Custom" service on sheets and strip steel call our nearest warehouse or sales office.

Fingertip QUALITY CONTROL, electronically operated, gives this 4-high, reversing type cold strip mill unusual flexibility in supplying *cold rolled steel strip* to your EXACT SPECIFICATIONS. Thicknesses .025 to .125 in all tempers, and in either bright or satin finish, are processed to your exact width in coil or cut lengths. Tempers ranging from dead soft to full hard, controlled by annealing and skin passing.

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20001 Sherwood Ave., Detroit 34, Mich.
Phone: TWinbrook 3-5000

PRODUCTION STEEL COIL, INC.
20001 Sherwood Ave., Detroit 34, Mich.
Phone: TWinbrook 3-5000

PRODUCTION STEEL CO. OF ILLINOIS
2801 Roosevelt Rd., Broadview, Ill. (Chicago)
Phone: MAnsfield 6-4242

SENECA STEEL SERVICE, INC.
1050 Military Rd., Buffalo 17, N. Y.
Phone: Riverside 7920

SALES OFFICES:

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Phone: Broadway 3468
E. W. Richardson, Sales Representative

PRODUCTION STEEL COMPANY
548 W. Mechanic Street, Jackson, Mich.
Phone: 2-9097
Glenn Christman, Sales Representative

PRODUCTION STEEL CO. OF ILLINOIS
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Phone: WOodruff 2-1206
H. Clive Morrison, Sales Representative

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Phone: Culver 7480
W. J. Knoll, Sales Representative

SENECA STEEL SERVICE, INC.
134 Northcliffe Rd., Syracuse, N. Y.
Phone: 73-5722
Dean Hethington, Sales Representative

SENECA STEEL SERVICE, INC.
347 Price Street, Jamestown, N. Y.
Phone: 5759
S. N. Olmsted, Jr., Sales Representative

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1040 High View Lane, Green Bay, Wisc.
Phone: Howard 7407
Tony Canadeo, Sales Representative

British Steel Famine Subsides

Steel production has been rising since mid-year, together with pig iron output. Other encouraging signs: Scrap stocks are building up, no coal shortage in sight

BRITISH steel-consuming industries now face an easier materials outlook than at any time in the past two years.

Plate and sheet mills remain overloaded with orders and defense demands continue to bulk large, but prospects of civilian steel users have changed entirely. For example, foundrymen, who were hard pressed to give delivery up to a few weeks ago, are looking for orders. Long delivery dates on agricultural machinery are being shortened with the more plentiful supply of steel.

Production Peaks — The annual steelmaking rate for the first 10 months of 1953 was 15,917,000 tons against 15,628,000 tons for the same period last year. But, output in the first half of this year was below that of 1951 so that second half production has been much better than the 10-month figure would indicate. September steel output, at a rate of 17,149,000 tons, was the second highest in the history of the British steel industry. October production was at the rate of 17,044,000 tons, highest ever recorded for the month.

Steel producers in turn have more raw materials than at any time in the past two years. September production of pig iron reached an alltime record at an annual rate of 10,845,000 tons. That's a million-tons-a-year greater than it was a year ago. Coal stocks have risen substantially and there are now no fears of a winter coal shortage.

Reverse Trend—The scrap situation has improved since last April when stocks at mills and foundries were at their lowest ebb of only 203,000 tons. Stocks have been raised to 328,000 tons. Two open hearths at the Clydesbridge works of Colvilles Ltd., idle nearly two years because of the scrap shortage, have been put into operation and will increase steel output at that works by 2000 tons a week.

What has all that meant to the British steel user? The acute stage of the steel famine in Britain is over. Allocations for the fourth quarter, 1952, were raised 5 to 7 per cent and further increases are looked for in 1953.

First for the Philippines

The first steel ingot mill in the Philippines is now operating at the Marcelo Steel Corp. plant there. Other units at the Marcelo plant include three electric furnaces, a rod-rolling mill and a fire-brick plant.

When the mill is in full production, output is expected to reach 44,000 tons of steel ingots. That production will enable the company to export about 11,000 tons which will be in excess of estimated local needs.

Export Quotas Are Set

First quarter, 1953, export quotas for steel, copper and aluminum, as announced by the Office of International Trade are:

Carbon Steel — 390,780 short tons with the possibility of a supplemental quota later. Fourth quarter, 1952, quota was 566,258 short tons, of which only 472,800 short tons was included on the original quota. The rest was made up of supplemental antes.

Alloy Steel—18,284 short tons, compared with 23,000 short tons, including supplemental quotas, set thus far in the fourth quarter.

Stainless Steel — 1,406,000 pounds, compared with 1,756,000 pounds, including supplementals, for the fourth quarter.

CMP Copper and Copper-base Alloy Products — 12,136,000 pounds. Initial fourth quarter quota rose to 12,650,000 pounds.

Aluminum — 8,000,000 pounds after being raised from 6,000,000 pounds. That's exactly what happended in fourth quarter, too.

Belgians Look to Schuman Plan

Here's one type of problem which the Schuman Plan must solve. In the Netherlands, some raw materials and finished products are under government quantity and price control. In Belgium, these restrictions are missing. Thus, cast iron scrap in Holland is priced at about $30 per metric ton, in Belgium, about $69. Theoretically, the Schuman pool will standardize the steel and scrap situation in participating countries.

Of course, the Schuman Plan will not affect wages, which are about 30 per cent lower in Holland than in Belgium.

BATTERY OF GRINDERS AT THE COCKRILL PLANT IN BRUSSELS
. . . the Schuman Plan is expected to solve some price problems

Personnel Conveyors: *A Look . .*

The solution to transportation snarls may lie underground. Will future generations of commuters travel on conveyor belts like this?

WILL TRAFFIC jams eventually drive public transportation underground? Don't start digging now, but recent events indicate a revolution in transportation may be underway.

Joint research by Goodyear Rubber Co., Akron, and Stephens-Adamson Mfg. Co., Aurora, Ill., has developed plans for an underground passenger conveyor belt which may substantially reduce congestion in large cities. Both companies are anxious to start operations — in 1953 if all goes well. Engineers aren't making rash promises, but future developments may interest steel producers looking for new markets and transportation officials harassed by bulging traffic on streets which cannot be expanded.

Plans Grow—Plans for the rubber-belt conveyor grew from the need for speeding cross-town traffic in New York. While existing subway and elevated lines carry millions of persons north and south through Manhattan, east-west traffic must elbow its way through increasingly congested canyons.

In April, 1950, after interchange of ideas among Goodyear, Stephens-Adamson and the New York City Board of Transportation, definite plans took shape. Col. Sidney H. Bingham, chairman of the New York board, urged installation of the conveyor in subway tunnels now used for shuttle service on crowded East 42nd Street. The belt would carry passengers 2300 feet between Grand Central Station and Times Square.

Quartet of Scientists—Now that talks have passed the "intriguing theory" stage, four Goodyear scientists devote full time to the project. A. A. Neilson, design department, and M. W. Sledge, manager of belting sales, head the research. At Stephens-Adamson, A. D. Sinden, chief engineer, is prominent in the belt's development.

The conveyor will consist of not one, but several separate belts. At each end of the beltline, passengers will enter by means of a moving sidewalk with a handrail in motion at an identical speed of 137 feet a minute or 1½ mph. The walk will consist of thin sheet metal on closely-spaced, rubber-cushioned rollers. From it, passengers will enter cars mounted on an adjacent belt, moving at the speed of the sidewalk. The cars, probably to be made of an aluminum alloy reinforced with steel, will seat ten. They will be spaced to pass the loading point continuously at 25 a minute, with a capacity of 15,000 persons an hour.

Into High Gear—As cars pass from the loading area, they will leave the 1½-mph belt and enter upon a series of pneumatic-tired accelerating rollers. Each row of rollers moves at a slightly higher speed until 15 mph is reached. At that point, the main belt will assume the load, carrying passengers to the "end of the line," where decelerating rollers lead to an unloading belt moving at 1½ mph beside a similarly moving sidewalk.

Once beyond the unloading platform, empty eastbound cars will leave the belt to be pulled by a positive action turnaround drum over a series of rollers to the westbound loading platform.

Steel in Demand—Planners say more steel than rubber will be needed in the conveyor. Undercarriages and rolls as well as pulleys and shafts to hold cars in place will require steel. Supports for conveyor rolls and drive machinery will be made of steel. The turnabout rolls at each end of the conveyor belt will be cast. In addition, rolls which need large numbers of bearings will be more numerous than those in freight conveyors, to provide a more comfortable ride. Underneath the center belt, rolls 68 inches in diameter spaced about ten feet apart will control speed of the main belt. Goodyear estimates 1200 tons of steel will be required for the New York installation. A. D. Sinden, of

. . into the Future

Stephens-Adamson, points out that plans have not been worked up in sufficient detail to say exactly how much steel will be used.

Other cities are expressing interest in the conveyor. William C. Reed, chairman of the board of Cleveland Transit System, has recommended a similar 3300-foot belt conveyor within the limits of the business district. A new rapid transit line, planned for completion in 1954, would funnel thousands of persons into downtown Cleveland where they could overload existing bus lines.

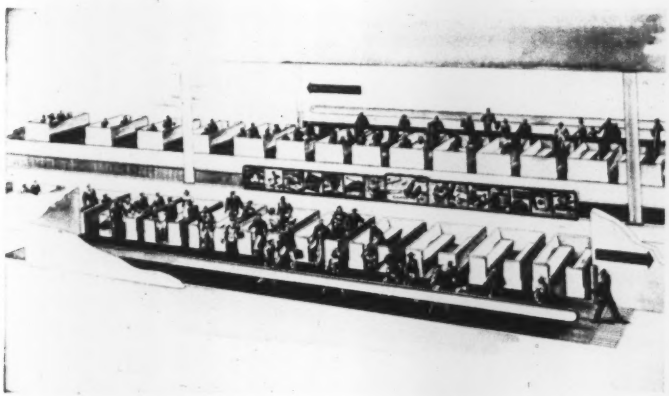
Obstacles Confront Conveyor—A sizing-up of the situation shows the ambitious conveyor plan facing severe obstacles before it can become a reality. The New York City Board of Transportation has inserted a $3.8 million appropriation in the city's 1953 capital budget for rehabilitation of the 34-year-old East 42nd Street subway. Goodyear engineers estimate conveyor equipment will cost $1.8 million, but expense of renovating the existing subway tube might be prohibitive.

In Cleveland, expense is an even greater problem. Equipment cost of $2.5 million will be outweighed by high expenses of drilling a subway where there isn't any at the present time.

Project planners draw a parallel between their conveyor belt and moving stairways which met with disapproval at first on the ground that they were risky, expensive and undependable. Gradually their installation proved they were safe and easy to maintain. Now escalators move much faster than before.

Speed and Safety—The underground conveyor has many of the advantages of the escalator. Continuous loading eliminates the buildup of crowds, a danger of "batch" transportation. Faster loading speed and slight design changes in cars could raise capacity from 15,000 to 32,000 persons an hour if needed.

Revolutions in public transportation aren't worked overnight. Although the era of quick mass transportation by conveyor belts may be years in the future, Goodyear and Stephens-Adamson engineers are proceeding with that goal in mind. "After all," they say, "someone has to take the first step."



TRAVEL TO THE OFFICE BY BELT
. . . these cars may carry you a few years hence

Western Steel Expands

Coastal states produce 6 per cent of national steel total, but more is required

STEEL INGOT production in the Far West has expanded to approximately 6 million tons annually, or roughly 6 per cent of the national total.

But even greater expansion of the region's steelmaking facilities is required to fill the needs of a growing economy and population, W. J. McClung, vice president in charge of operations for Bethlehem Pacific Coast Steel Corp., told a regional technical meeting of the American Iron & Steel Institute last week in San Francisco.

Mr. McClung said the 19,360,000 persons in the 11 states of the Far West presently are consuming about 1400 pounds of steel per person annually.

Steel Pipe—Another speaker was Richard Aubrey, metallurgical engineer, Kaiser Steel Corp., Fontana, Calif., who said production of steel pipe in seven of the western states last year was 724,000 tons. Before 1942, pipe production averaged 25,000 tons a year. Most of the pipe made in the area, he said, is produced by electric weld processes.

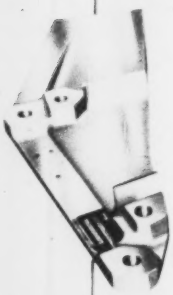
Other speakers at the annual institute regional meeting were: Dr. Morrough P. O'Brien, chairman, department of engineering, University of California; A. H. Zeilinger, superintendent, safety department, Colorado Fuel & Iron Corp.; R. E. Kerr, supervisor, specifications divisions, Geneva Works, Columbia-Geneva Steel Division, U. S. Steel Co., and M. S. Farwell, sales engineer, Bethlehem Pacific Coast Steel Corp.

Wanted: 95,000 Freight Cars

Class 1 railroads should have 95,000 additional freight cars, the Association of American Railroads declares. Individual railroads supporting expansion of car building are aiming for a goal of 1,850,000 freight cars by Dec. 31, 1954.

Increased production depends on adequate steel supplies. Association officials asked the government to allocate sufficient steel to construct 10,000 cars monthly.

where *Precision* counts

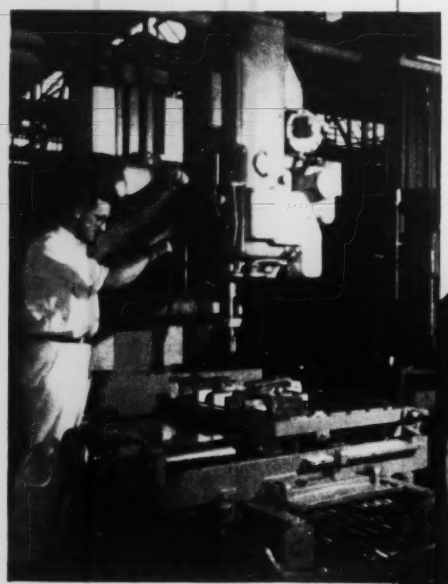


a natural combination hard to beat . . .

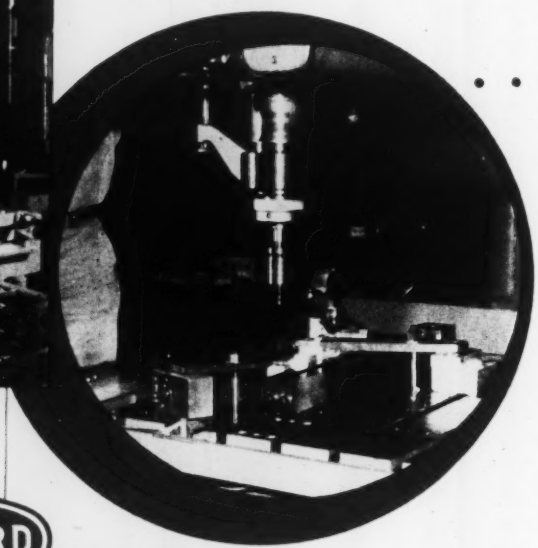
Bullard 30 x 20 Spacing Table installed on Cincinnati-Bickford fixed arm Precision Drilling Machine at Convair (Consolidated Vultee Aircraft Corporation, San Diego, California) is proving that these two units "pay-off" in elimination of jig cost, speeding-up production and accuracy in repetitive drilling on a variety of work.

A new job goes into immediate production with no lost time — no waiting for preparation of jigs.

Simple and comparatively fast change-over from one job to another minimizes production tie-ups.



Precision work materially reduces if not entirely eliminating spoilage and provides complete interchangeability of parts.



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Ask for information on Precision Drilling without Jigs

We can offer FAVORABLE DELIVERIES on BULLARD SPACERS

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B R I D G E P O R T 2 • C O N N E C T I C U T

By H. C. TUTTLE *Detroit Editor*

Mirrors of Motordom

Packard develops a new power steering unit that takes a course midway between Chrysler and GM engineering approaches to the device

DETROIT

INTO THE automotive scene has come a new kind of power steering which belongs neither to the Gemmer-Chrysler school of thought nor to the GM Saginaw Steering Gear Division clan.

Developed by Packard engineers in collaboration with Bendix, the new hydraulic powered system is not integral with the steering gear but applies itself to the linkage after the Pitman arm of the steering gear has been moved.

Compromise — In designing the new unit the engineers apparently took cognizance of the pros and cons which the other two types of power steering devices have caused and incorporated a number of compromises into the Packard unit. These compromises fall into three categories: Road feel is one. Another is full-time or part-time operation. Third category is steering gear ratio.

Any movement of the steering wheel brings the Gemmer unit into operation, and with power applied instantaneously some drivers believe that they have lost "the feel of the road" and are not sure just where their wheels are pointing. Saginaw Steering Gear's unit, on the other hand, gives an assist in steering only when a built-in resistance of 3-4 pounds is overcome by the driver's pressure on the steering wheel. Chrysler engineers reduced the steering gear ratio to make the car more responsive to small movements of the wheel, while General Motors' idea was to hold to about the same ratio so that new steering technique did not have to be learned when operating a power-equipped car.

No Extreme—Packard steers a middle course through the extremes. Its unit is in operation at all times, but the system does not provide the full-scale boost until deviation from the straight path gets expression at the Pitman arm where the system's control valve is located. Packard has brought the steering gear ratio down to mid-way between Chrysler's 16 to 1 figure, and General Motors 21.3 to 1. Packard's is 18.6 to 1, compared to 20.4 to 1 for the smaller Packard and 22.3 to 1 for the larger car not equipped with the power unit.

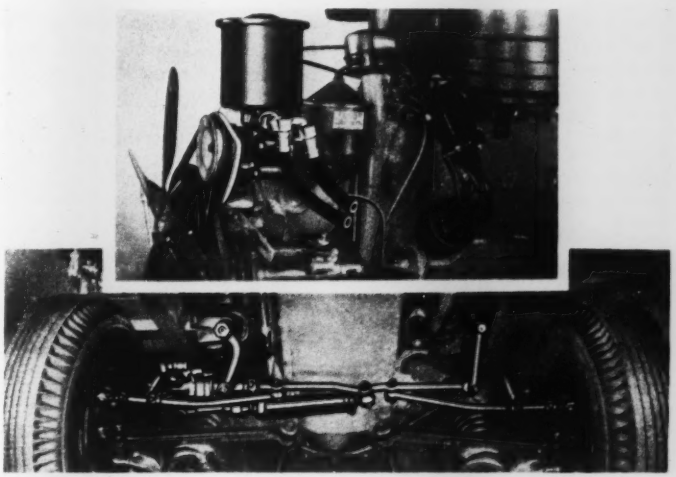
To apply power to the steering linkage the Packard unit is hung beneath the car in a transverse position. The control valve mechanism is attached directly to the lower extremity of the Pitman arm where it attaches to the steering linkage, and the power cylinder lies adjacent but at a slight angle to the steering linkage connecting rod. When activated by the flow of hydraulic fluid into one side or the other of this cylinder—depending upon which way the Pitman arm moves the control valve spool, —the entire cylinder moves, the stationary portion being the piston which is attached to the car's frame. The cylinder's movement is thus translated into movement of the steering knuckle lever at right and left wheels.

Safeguards—With return of the steering wheel to the straight ahead position a free circulation of the hydraulic fluid through both sides of the power cylinder relieves it of pressure. Any kickback by the wheels, in going off a road shoulder, for example, activates the pressure system so that the shock does not get back to the steering wheel. And as with the other two systems the car can be steered with the power unit giving no interference if it should fail, or if the car's engine is stopped.

Each Packard Line Distinctive

The new Packard and Packard Clipper lines, each to be filled out with a complete set of models after the first of the year, are styled with wrap-around hard-top-styled rear windows, and are graced with new applications of chrome trim to give each line a distinctive appearance.

Beneath the hood of the two



Two views of the new power steering unit for 1953 Packards show the pump, upper, mounted at the left forward end of the engine and linkage details below

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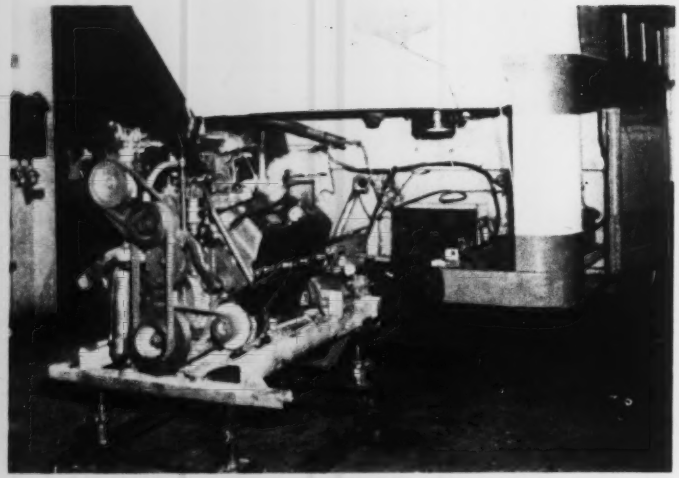

New Engine Mounting Speeds Servicing

Above, a bus manufactured by a subsidiary of Checker Cab Mfg. Corp., Kalamazoo, Mich., utilizes a new Le Roi overhead-valve V-8 engine mounted in a subframe to speed engine servicing. The entire unit can be removed quickly by uncoupling connections and withdrawing four bolts. This innovation cuts time and expense of overhaul for Checker Cab busses which strive for simplicity of servicing

lines are reworked power plants which put them into the new high compression class. The Packard engine, developing 180 horsepower through redesign of the combustion chamber and increase in compression ratio to 8 to 1, is up 25 horsepower from last year. A four-barreled carburetor also contributes to the power output of this engine. In Clipper Deluxe series cars the same compression ratio and engine redesign brings about a 25-horsepower increase to 160 horsepower. In the standard Clipper 15 points are picked up to give 150 horsepower. Compression ratio is 7.7 to 1. Quicker acceleration and improved performance is claimed for the modified Ultramatic transmission.

Lincoln Emphasizes Power

Another car to offer power steering for the first time is Lincoln, it buying the power assist unit from GM's Saginaw Steering Gear Division.

This, however, is not Lincoln's big noise for 1953. The overhead valve V-8 engine which appeared last year developing 160 hp has been souped up to turn out 205 horsepower, making it the most powerful American production engine available at the present time.

The new car will be introduced to the public Dec. 2 under the most spectacular circumstances. It has just won the first four places for stock cars in the 1938-mile Mexican Pan-American road race, three of the four cars beating the previously established course record for stock cars. Those three cars averaged slightly over 90 mph for the run. The three other 1953 Lincolns which had been entered in the race were forced out by accidents.

While Lincoln's 205 hp temporarily tops the list, Cadillac and Chrysler are both expected to come along with more power—Cadillac 210 and Chrysler 220, are the rumors. Lincoln's sweep of the Mexican race will, however, give it a talking point which the other firms will have to go some to outdo.

Lincoln's new-found power is obtained from the improved "breathing" procedure of getting more air-fuel mixture to the combustion chamber. A four-barrel carburetor is now used; larger intake manifold runners, larger intake valves, and higher intake valve lift permit freer entrance. A new shape of the combustion chamber has resulted in a greater squeeze of the mixture, the compression ratio being upped from 7.5 to 1 to 8 to 1, and greater turbulence of the mixture also results.

Auto, Truck Output

U. S. and Canada

	1952	1951
January	409,406	645,688
February	467,691	658,918
March	517,207	792,550
April	576,505	680,281
May	546,673	695,898
June	560,947	653,682
July	246,461	522,858
August	293,722	571,442
September	593,060	505,758
October	654,357*	558,971
November	515,000*	480,199
December		402,729
Total		7,179,161

Week Ended	1952	1951
Oct. 25	144,747	121,215
Nov. 1	155,037	118,743
Nov. 8	143,610	117,342
Nov. 15	146,825	120,767
Nov. 22	129,345	80,489
Nov. 29	95,000*	119,962

Sources: Automotive Manufacturers Association, Ward's Automotive Reports. *Preliminary.

K-F Introduces "Dragon"

As the luxury model of Kaiser-Frazer's 1953 line, the "Dragon" was last week introduced. Its oriental flavor comes from such appointments as abstract patterns on the interior upholstery and brightly colored vinyl plastic in what appears to be bamboo strips laced together for interior trim and exterior top covering.

New Plymouth Goes Own Way

Last of Chrysler's car divisions to bring its 1953 wares before the buying public is Plymouth, which like the others has a completely new body. For the first time, the body is all Plymouth's, Dodge going its separate way, too. So the two divisions no longer have common panels or similar looks.

The new car is about four inches shorter in over-all length and wheelbase than its predecessor, yet more interior room for passengers and luggage has been provided. Not in the line this year is the small Concord series. Certain to be appreciated by owners of the two-door models is the front seat which is divided not at the center but at the right one-third, so a front-seat passenger needs to move over only slightly toward the center to permit a rear-seat occupant to enter or leave the car.

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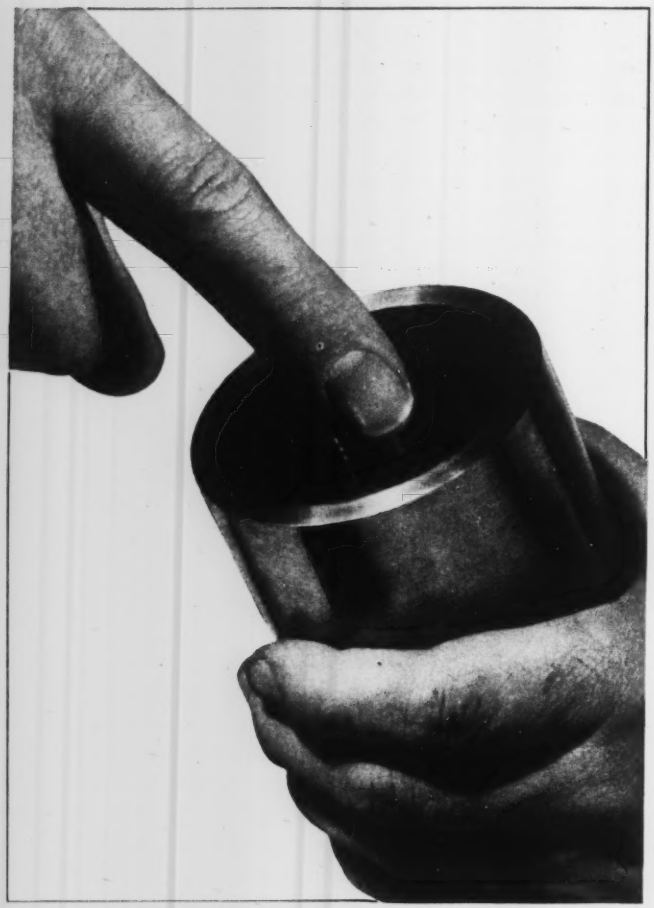
Save steel and machining time—let us do the hole job



THE center hole's already in Timken* seamless steel tubing. Less metal to machine away saves machining time and gives you more parts per ton of steel.

Finish boring is often the first step, releasing screw machine stations for other operations and providing greater machine capacity without adding costly machines.

And by using the Timken Company's tube engineering service, you can save even more steel. Our engineers will study your problem and recommend the most economical tube size for your job, guaranteed to clean up to your dimensions.

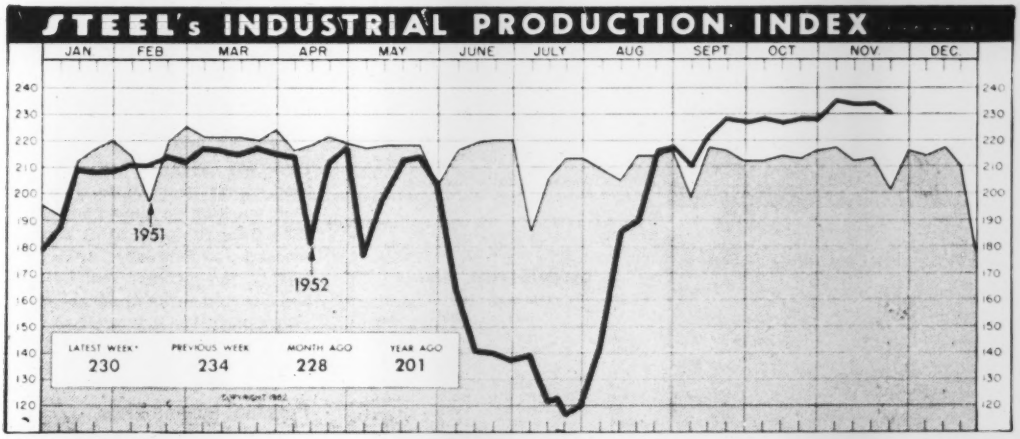
Since the piercing process used to make Timken tubing is basically a forging operation, it produces uniform spiral grain flow and refined grain structure. You're sure of fine forged quality in your product.

And the Timken Company's rigid quality control insures uniformity from tube to tube and from heat to heat.

For more information about the use of Timken seamless tubing, write The Timken Roller Bearing Company, Steel and Tube Division, Canton 6, Ohio. Cable address: "TIMROSCO".

YEARS AHEAD—THROUGH EXPERIENCE AND RESEARCH

SPECIALISTS IN FINE ALLOY STEELS, GRAPHITIC TOOL STEELS AND SEAMLESS TUBING



*Week ended Nov. 22 Based upon and weighted as follows: Steelworks Operations 35%, Electric Power Output 23%, Freight Car Loadings 22%, and Automotive Assemblies (Ward's Reports) 20%.

Rising production is losing momentum. Industrial activity may flatten out in the third quarter of 1953. Index edges downward as model change-overs cut auto-truck output

INDUSTRIAL machinery is humming at a record rate, but indications point to a leveling-off period ahead.

This is seen in the Commerce Department's index of the dollar volume of the nation's goods and services, known as the Gross National Product. Gains in the GNP during 1952 are expected to be substantially less than in 1951 and 1950.

In the fourth quarter, the GNP may rise to a $350 billion annual rate. This would bring the year's average to $344 billion, or $15 billion above the $329-billion GNP for 1951. Defense and consumer spending probably will account for most of the increase. Expenditures on new plant and equipment may rise slightly above 1951, while new housing is expected to stay near the 1.1 million units of last year.

Small Rise—Yet the $15 billion rise makes a poor showing when compared with the increases of $46 billion in 1951 and $25 billion in 1950. Will defense expenditures and consumer purchases continue to push up the nation's output?

Defense outlays are now at a $78 billion annual rate and are slated to increase throughout the first half of 1953. After that, government expenditures will probably level off. The other buoyant factor, consumer goods spending, supplies the big question mark. Manufacturers and retailers are wondering if the present upsurge in civilian goods production means another siege of top-heavy inventories.

Index—Pushed down by automotive change-overs, STEEL's industrial activity index for the week ended Nov. 22 dipped 4 points to 230 per cent of the 1936-1939 average. Steel production that week remained at 106 per cent of rated capacity. Electric power production and freight car loadings increased slightly. A sharp decline of about 12 points was expected for the week ended Nov. 29, when Thanksgiving cut the nation's industrial activity.

Steel Production Dips . . .

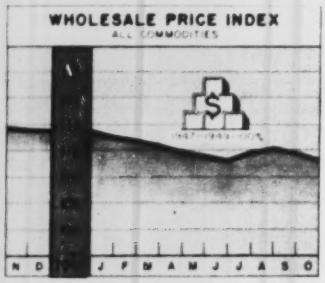
With demand for steel higher than expected, steel plants are continuing to pour a heavy tonnage. The American Iron & Steel Institute estimates that 2,191,000 net tons of steel for ingots and castings were poured in the week ended Nov. 29. This would mean the first dip under 2.2 million net tons in eight weeks.

Dim View for Autos . . .

Automakers are tempering their former predictions of a large passenger car output in the first quarter. Inadequate steel supplies are dimming the outlook. The industry is authorized to produce 1,250,000 passenger cars in the first quarter. But shortages of certain steel products may trim 290,000 to 390,000 units off the passenger car goal. This may mean Detroit will face appreciable unemployment in February and March.

Model change-overs are taking a thick slice off present automotive production. Assembly lines lost about 10,000 passenger cars and 4000 trucks when the U. S. industry total dropped to 124,164 units during the week ended Nov. 22, says *Ward's Automotive Reports*. The 124,164-unit output, however, looms high over production in the comparable week in 1951, when U. S. auto-truck turnout was 78,110 assemblies.

U. S. and Canadian plants in the week ended Nov. 22 assembled 129,342 passenger cars and trucks, compared with 146,825 units a week earlier. In the corresponding week

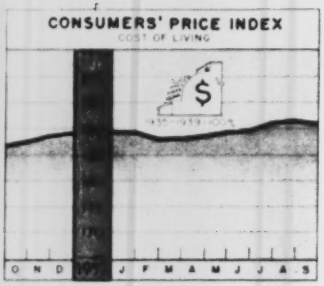


Wholesale Price Index

(1947-1949 = 100)

	1952	1951	1950
Jan.	113.0	125.0	97.7
Feb.	112.6	116.5	98.3
Mar.	112.3	116.5	98.5
Apr.	111.8	116.3	98.5
May	111.6	115.9	99.6
June	111.3	115.1	100.2
July	111.8	114.2	103.0
Aug.	112.2	113.7	106.2
Sept.	111.7	113.4	107.1
Oct.	111.2	113.7	107.7
Nov.		113.6	109.3
Dec.		113.5	112.1

U. S. Bureau of Labor Statistics

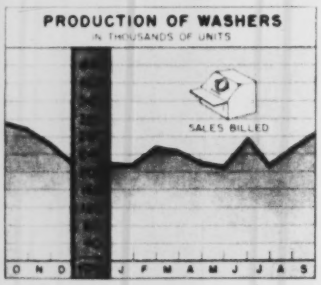


Consumer Price Index

(1935-1939 = 100)

	1952	1951	1950
Jan.	189.1	181.5	168.2
Feb.	187.9	183.8	167.9
Mar.	188.9	184.5	168.4
Apr.	188.8	184.6	168.5
May	189.0	185.2	169.3
June	189.6	185.2	170.2
July	190.8	185.5	172.0
Aug.	191.1	185.5	173.4
Sept.	190.8	186.6	174.6
Oct.	190.9	187.4	175.6
Nov.		188.6	176.4
Dec.		189.1	178.8

U. S. Bureau of Labor Statistics

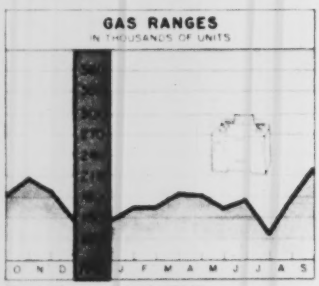


Household Washers

Sales Billed—Units

	1952	1951	1950
Jan.	213,998	321,092	275,576
Feb.	255,864	341,328	342,907
Mar.	248,431	368,455	423,502
Apr.	217,211	292,193	333,072
May	213,668	253,942	304,640
June	274,457	253,119	325,217
July	207,593	139,779	282,261
Aug.	234,537	239,081	381,452
Sept.	283,732	313,756	424,043
Oct.		297,219	439,924
Nov.		262,184	329,964
Dec.		218,604	317,013
Totals		3,301,123	4,289,931

American Home Laundry Mfrs. Assn.



Gas Ranges

Shipments in Units

	1952	1951	1950
Jan.	166,100	260,600	165,000
Feb.	166,200	254,000	209,000
Mar.	180,200	289,800	264,000
Apr.	182,300	225,000	239,100
May	162,800	177,800	242,800
June	175,700	128,500	217,000
July	124,500	136,400	254,800
Aug.	170,000	168,200	331,500
Sept.	218,600	183,600	287,000
Oct.		210,900	308,000
Nov.		192,200	269,100
Dec.		145,800	255,900
Total		2,348,900	3,023,200

Gas Appliance Mfrs. Assn.

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Issue Dates on other FACTS and FIGURES Published by STEEL

Consumer Credit	Nov. 24	Gear Sales	Nov. 17	Ranges, Elec.	Sept. 29
Durable Goods	Sept. 22	Gray Iron Castings	Nov. 3	Refrigerators	Sept. 29
Empl., Mfg.	Oct. 27	Index, Production	Nov. 17	Steel Castings	Nov. 3
Employ., Steel	Oct. 27	Boilers	Nov. 10	Steel Forgings	Oct. 20
Fab. Struc. Steel	Oct. 27	Machine Tools	Nov. 10	Steel Shipments	Nov. 3
Foundry Equip.	Nov. 24	Malleable Castings	Nov. 3	Vacuum Cleaners	Nov. 10
Freight Cars	Nov. 24	Pumps	Oct. 13	Wages, Mfg.	Nov. 17
Furnaces, Indus.	Nov. 24	Radio, TV	Oct. 6	Water Heaters	Oct. 13

of 1951, the two nations produced 86,313 passenger cars and trucks.

Machine Tool Orders Lag . . .

Machine tool builders are continuing to cut into their backlog, as industry shipments outpace incoming orders. The National Machine Tool Builders Association's index for shipments in October dipped slightly to 357.6 per cent of the 1945-1947 average. New orders that month declined to 243.7 per cent, marking an almost steady decline from the peak 615.3 per cent reached in February, 1951. On Nov. 1, the machine tool industry had eleven months' work ahead. A year earlier, the industry had twice as many months' work on unfilled orders.

Personal Income Rises . . .

Personal income will rise 5 per cent to a record $267 billion in 1952. That's the prediction of the Federal Reserve Board, which expects disposable income to be 4 per cent higher this year than last. But this doesn't mean an assured uptrend in consumer purchases.

Manufacturers of civilian goods can take a look at the Labor Department's cost-of-living index. Consumer prices in October reversed a two-month downtrend and inched up to 190.9 per cent of the 1935-1939 average (see chart, left). The cost-of-living will probably continue rising as food prices increase.

Retail Sales Declining . . .

The recent upsurge in retail sales may have fizzled out. The Federal Reserve Board says that the dollar volume of the nation's department stores in the four weeks ended Nov. 15 dipped 1 per cent under the poor volume in the same weeks of 1951. Store sales in the week ended Nov. 15 also dipped 1 per cent under the same 1951 week, which—in turn—declined 8 per cent under department store sales during the week ended Nov. 18, 1950.

Refrigerator Sales Plunge . . .

After surging upward in the summer months, sales of electric refrigerators and ranges in Sep-

BAROMETERS OF BUSINESS

	LATEST PERIOD*	PRIOR WEEK	YEAR AGO
INDUSTRY			
Steel Ingot Output (per cent of capacity)[2]	106.0	106.0	103.0
Electric Power Distributed (million kwhr)	7,830[1]	7,806	7,157
Bituminous Coal Output (daily av.—1000 tons)	1,761	1,650	1,934
Petroleum Production (daily av.—1000 bbl)	6,700[1]	6,622	6,232
Construction Volume (ENR—millions)	$269.9	$411.5	$163.1
Automobile, Truck Output (Ward's—units)	129,342	146,825	86,313
TRADE			
Freight Car Loadings (unit—1000 cars)	840[1]	829	711
Business Failures (Dun & Bradstreet, number)	135[1]	148	149
Currency in Circulation (millions)[3]	$29,842	$29,905	$28,701
Dept. Store Sales (changes from year ago)[3]	−1%	−8%	−8%
FINANCE			
Bank Clearings (Dun & Bradstreet, millions)	$20,299	$14,950	$18,828
Federal Gross Debt (billions)	$265.1	$264.9	$258.1
Bond Volume, NYSE (millions)	$26.0	$19.8	$11.1
Stocks Sales, NYSE (thousands of shares)	9,602	5,893	4,942
Loans and Investments (billions)[4]	$77.0	$77.0	$72.5
United States Gov't. Obligations Held (billions)[4]	$32.0	$32.3	$31.5
PRICES			
STEEL's Weighted Finished Steel Price Index[5]	181.31	181.31	171.92
STEEL's Nonferrous Metal Price Index[6]	214.7	215.4	234.9
All Commodities[7]	110.4	110.7	113.7
All Commodities Other Than Farm and Foods[7]	113.0	113.0	114.6

*Dates on request. [1]Preliminary. [2]Weekly capacities, net tons: 1951, 1,999,035; 1952, 2,077,040. [3]Federal Reserve Board. [4]Member banks, Federal Reserve System. [5]1935-1939=100. [6]1936-1939=100. [7]Bureau of Labor Statistics Index, 1947-1949=100.

tember dropped to the lowest volume since May. Factory sales of household electric refrigerators in September totaled 272,985 units, well below the 366,372 refrigerators sold in August, but 79,056 units over refrigerator sales in September, 1951, during the lull in consumer purchasing, says the National Electrical Manufacturers Association.

Sales of electric ranges in September fared even worse. Factory sales of ranges dropped to 64,260 units, the lowest volume in over a year. August sales totaled 77,282 units.

Liabilities Hit Peak . . .

Business failures in October rose to a four-month high, while liabilities climbed to the highest level in three years. Mortalities rose 17 per cent in October to 631 companies, says Dun & Bradstreet Inc. Casualties were almost as numerous as a year earlier, but under October failures in 1950 and 1949. The three-year peak in liabilities totaled $35,049,000, the largest October volume in 20 years. The liability total in October was swelled $24 million as 49 exceptionally large businesses succumbed.

Manufacturing and construction failures rose to the highest level since April, but retail failures rose less sharply. The month's only decline occurred in wholesale trade, which had the fewest failures since October, 1951.

Sweeper Sales Expand . . .

While demand may lag for some larger appliances, vacuum cleaner manufacturers are finding little vacuum in their sales. The Vacuum Cleaner Manufacturers' Association reports that factory sales of household vacuum cleaners in October rose to 292,474 units, the highest volume in two years. October sales were 23 cent greater than cleaners sold in the preceding month and 12 per cent greater than the 259,469 units sold in October, 1951.

Trends Fore and Aft . . .

Bank clearings soared above the $20-million mark for the third time this year in the week ended Nov. 19 . . . October building permits rose 12 per cent above October 1951 . . . Loans to metalworking companies decreased $49 million between June 25 and Nov. 12 . . . Employment of women workers in nonagricultural industries in September rose to a postwar peak of 17.9 million, about 1 million over September, 1951.

Will Keep Your Assembly Lines at Peak Capacity

Whatever you manufacture or assemble, you can speed production and improve your product by using Pheoll screws, bolts and nuts. These industrial fasteners drive easy and straight, and will not bind because threads are accurately rolled or machined. Precision-made screw and bolt heads, slots and head recesses prevent wrench and driver slippage. Count, too, the added bonus you receive by using fasteners that improve product appearance.

An interesting story on standard and special industrial fasteners and their profitable applications to your needs may be obtained from experienced Pheoll engineers. Ask these men to recommend screws, bolts and nuts that will increase your overall profits on assembly line work.

these Pheoll products prevent production lag

Tapping Screws • Cap Screws • Sems • Phillips Recessed Head Screws and Bolts • Machine Screws • Special Fasteners • Thread Cutting Screws

PHEOLL SCREWS BOLTS

Speed Nut Savings Stories

Magic Chef PROVES . . . "It's no trick at all"

. . . to find New Savings with SPEED NUTS!

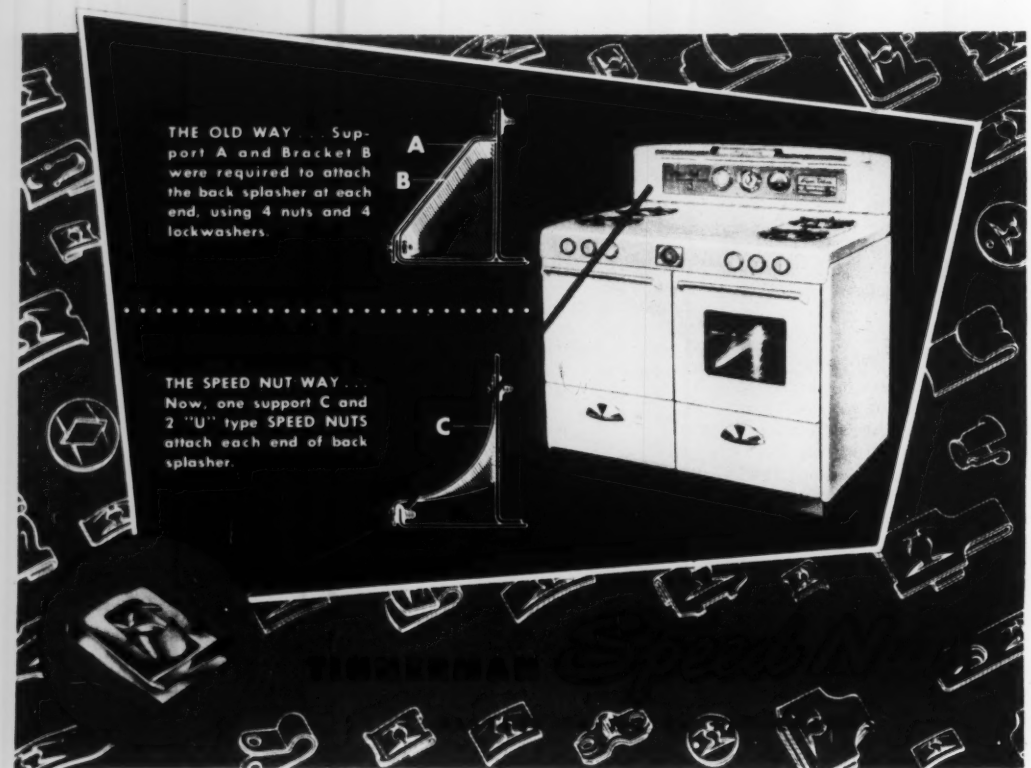
Magic Chef, Incorporated, St. Louis, Missouri, veteran user of SPEED NUTS, adds still another Savings Story to a long list!

Magic Chef engineers and designers have come to rely on assembly and material savings through the use of Tinnerman SPEED NUTS. That's why they again turned to Tinnerman when looking for better fastening methods for the back splasher assembly on a new line of ranges. The result—a neat 22% savings—sold them more than ever on the SPEED NUT economy factor.

Formerly, the back splasher was held in place with two-piece support brackets, threaded nuts and lockwashers. Now, the SPEED NUT WAY, simplified one-piece brackets and "U" type SPEED NUTS do the job better, faster and at less cost! "U" type SPEED NUTS are self retaining, one-piece, self locking fasteners that snap quickly and easily in place on the panel in screw-receiving position. They tighten down without being held . . . eliminate lockwashers . . . reduce materials handling to a minimum.

No matter what you manufacture, turn to Tinnerman for fastening efficiency and economy. The Tinnerman representative in your area is ready to assist you. Call him in, he can arrange a FREE FASTENING ANALYSIS of your product to iron out your fastening problems. Contact him today! Or write direct to: Tinnerman Products, Inc., Dept. 12, Box 6688, Cleveland 1, Ohio.

In Canada—Dominion Fasteners Ltd., Hamilton, Ontario. *In Great Britain*—Simmonds Aerocessories, Ltd., Treforest, Wales. *In France*—Aerocessoires Simmonds, S.A.—7 rue Henry Barbusse, Levallois (Seine).


THE OLD WAY . . . Support A and Bracket B were required to attach the back splasher at each end, using 4 nuts and 4 lockwashers.
A
B
THE SPEED NUT WAY . . . Now, one support C and 2 "U" type SPEED NUTS attach each end of back splasher.
C

Men of Industry

A. C. HARRISON
. . . Nat'l Radiator plant mgr.

JAMES F. BISHOP
. . . gen. mgr., American Hoist & Derrick

C. T. EVERETT
. . . new position at Bingham-Herbrand

A. C. Harrison was appointed manager of the Middletown, Pa., steel boiler fabricating plant of **National Radiator Co.** He most recently was a production supervisor at the Columbus, O., plant of North American Aviation Inc., and before that was with Curtiss-Wright Corp.

Hendey Machine Co., Torrington, Conn., elected **E. G. Seybold** executive vice president, **Helge G. Hoglund** vice president in charge of sales, and **Bernard Sassen**, chief design engineer. Mr. Hoglund formerly was general sales manager at Heald Machine Co. Mr. Sassen was with Monarch Machine Tool Co.

Wilbur F. Koester and **Sigurd K. Rudorf** were appointed managers of the plant engineering and tool engineering departments, respectively, of **Allis-Chalmers Mfg. Co.'s** general machinery division, Milwaukee.

Ted C. Schraer, formerly manager of the Cincinnati district sales office, **Youngstown Sheet & Tube Co.**, moved to general offices in Youngstown as assistant manager of conduit sales. He is succeeded by **C. B. Mullender. George D. Wick III** now represents the company at Charlotte, N. C. He succeeds the late **Clarence D. Holland.**

James F. Bishop, in addition to his duties as secretary-treasurer, **American Hoist & Derrick Co.**, St. Paul, was appointed general manager. He has also been a director.

E. Woodward Allen was elected vice president, **Thomas A. Edison Inc.**, West Orange, N. J. He will serve as assistant to G. E. Stringfellow, vice president and manager, storage battery division.

Holcroft & Co., Detroit, appointed **J. H. Bradley** vice president in charge of the Chicago office. He replaces **C. H. Martin**, resigned because of ill health. Mr. Martin continues on the board of directors.

Changes in management of the steel works department, **Weirton Steel Co.**, Weirton, W. Va., include: **Charles Carr Sr.**, named manager to succeed **P. R. Church** who retired because of illness; **William McGarrity**, assistant manager; and **Robert Allard**, assistant to the manager.

Philip G. Brumder was elected president, **Blackhawk Mfg. Co.**, Milwaukee. He succeeds his father, **Herbert P. Brumder**, who becomes chairman of the board, a newly created post. **Louis E. Bertane** was appointed vice president in charge of export sales.

C. T. Everett, vice president and general manager, Aviation Division, **Bingham-Herbrand Corp.**, was appointed assistant general manager of the corporation's Fremont, O., operations which include the Herbrand Forging Division and the Aviation Division.

Clyde W. Seymour, formerly manager of the production control department, was named assistant manager of the manufacturing division, **Solar Aircraft Co.**, at San Diego, Calif. He is replaced by **W. Robert Bruce**, who was assistant manager, production control.

Griscom-Russell Co., New York, elected **Oscar W. Heimberger** vice president-engineering and **Robert M. Wallace** vice president-manufacturing. Mr. Heimberger has been chief engineer, Mr. Wallace, works manager, Massillon, O., plant.

Charles E. Sharp, for the last 11 years with Truscon Steel Co. in Youngstown, joined **American Welding & Mfg. Co.**, Warren, O., as manager of customer service.

Insul-Mastic Corp. of America named **John C. Tyler** as its southern regional manager. He will be located in the Houston office.

Alan P. Benson will serve as ex-

THOMAS A. MORGAN
a dir. of Pressed Steel Car Co.

JOHN F. NEWHARD
Shakeproof production control mgr.

EDGAR SCHMUED
joins Northrop Aircraft

trusion sales representative for **Wisco Aluminum Corp.** in Michigan and Ohio.

Thomas A. Morgan was elected to the board of directors of **Pressed Steel Car Co. Inc.**, Chicago. He recently retired as president and chairman of Sperry Corp. of which he had been chief executive officer since its formation in 1933.

Morse Chain Co., Detroit, a Borg-Warner Corp. subsidiary, appointed **C. H. Erbacher** manager of its Detroit branch sales office and **Walter C. Bass** of its Ithaca, N. Y. office.

John C. Alberts rejoined the sales staff of the machine division, **Osborn Mfg. Co.**, Cleveland. He will have headquarters in the Chicago office to serve northern Indiana, northern Illinois, Iowa, Wisconsin and Minnesota.

John F. Newhard was made production control manager, **Shakeproof Division**, Illinois Tool Works, Chicago. He previously served with A. O. Smith Corp., Highway Trailer Co. and U. S. Steel Co. in production control and planning capacities.

Richard B. Fialho, formerly of Consolidated-Vultee Aircraft Corp., was named manager of **Kaiser-Frazer Corp.'s** scheduling and estimating department for aircraft.

Trabon Engineering Corp., Cleveland, appointed **J. G. Baldwin** as regional sales representative in Georgia. He will have headquarters in Atlanta.

Edgar Schmued joined **Northrop Aircraft Inc.**, Hawthorne, Calif., as technical assistant to the president. He formerly was vice president in charge of engineering of Aircraftsmen Co., Los Angeles.

Adam J. Buderkin, formerly plant superintendent, was made plant manager, **True Temper Corp.**, Dunkirk, N. Y. He succeeds **Neil J. Benton**, resigned.

Dravo Corp. appointed **George W. Baker** sales engineer in the Indianapolis office.

L. Joseph Moyes replaces **E. C. Bosl** on the Milwaukee sales staff, **Hanson-Van Winkle-Munning Co.** Mr. Bosl transfers to the Chicago office to give electrochemical service to customers in the Midwest.

Francis J. Bittel was transferred from **Youngstown Sheet & Tube Co.'s** plant at Indiana Harbor, Ind., to general offices in Youngstown as assistant manager of the company's claims department.

B. W. Kinderman was elected comptroller, **DeWalt Inc.**, subsidiary, American Machine & Foundry Co., Lancaster, Pa.

Jones & Laughlin Steel Corp., Pittsburgh, appointed **Harvey J. Haughton** director of works accounting, and **C. J. Lause Jr.** chief accountant of the Otis Works Division, Cleveland.

William Strickland, sales engineer for **Timken Roller Bearing Co.**, was transferred from the Houston to the Detroit offices. He assumes his new duties Dec. 8. **J. J. McGrann** was transferred from Los Angeles to the Houston office.

Oliver Iron & Steel Corp., Pittsburgh, appointed **John E. Munn** development engineer.

Drake Steel Supply Co. appointed **John Finn** sales manager with headquarters in Los Angeles. He has been manager of the steel department of Triangle Steel Products Corp.

Edward Pecuil was promoted to plant superintendent, **International Graphite & Electrode Division**, Speer Carbon Co., Niagara Falls, N. Y.

John E. Giere was named to the Cleveland regional sales staff of **Udylite Corp.**

Theron D. Whidden Jr. was named southeastern representative for **Utica Drop Forge & Tool Corp.** His headquarters are Jacksonville, Fla.

Earle H. Schlitt joined the air conditioning sales department of **Trane Co.**, La Crosse, Wis.

Joseph B. Rice Jr. becomes general manager and chairman of the board of **Beckman & Whitley Inc.**, San Carlos, Calif. He previously was production manager at Beckman Instruments Inc., and had held the

In these days of

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WILL SAVE YOU MONEY!

The unusual uniformity of gauge in MicroRold allows for closer die setting, assuring the fabricator of uninterrupted production in stamping, forming and blanking operations.

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From edge to edge—and end to end—only MicroRold has such outstanding uniformity of gauge.

WASHINGTON STEEL CORPORATION

WASHINGTON, PENNSYLVANIA

same position with Bendix Aviation Corp.

Gerlinger Carrier Co., Dallas, Oreg., appointed **George Lichty** assistant sales manager of the western division.

Charles H. Lucke was named manager of the Bridgeport, Conn., plant of **American Chain & Cable Co. Inc.** succeeding the late **Alfred A. Hall**.

Scripps Motor Co., Detroit, elected **William J. Scripps** as chairman of the board and **John J. Downey** as president. **Robert W. Scripps** is vice president; **Richard M. Spitzley**, secretary-treasurer; and **E. G. Mosteller**, assistant secretary-treasurer.

Joseph H. Milne was appointed assistant general manager, **Plate & Structural Steel Ltd.**, Toronto, Ont. He formerly was comptroller.

Leonard Morey was elected president, **Morey Machinery Co. Inc.**, New York, to succeed **Sigmund M. Morey**, now chairman of the board. **E. Pace Blanchard** joins the company as sales manager in charge of new American machine tools. **Dudley T. Himoff** is vice president and **Robert Morey**, vice president-secretary. Mr. Blanchard had been director of sales at Bullard Co. and retired from that company in 1950 after 30 years' association.

Wilbert G. Prasse was advanced from vice president in charge of sales to the presidency of **Oilgear Co.**, Milwaukee, to succeed the late **George Fobian**. **Frank G. Kuhagen** was elected vice president in charge of sales and a director of the company.

W. L. VOEGELI
asst. dir.-eng. for Allis-Chalmers

W. L. Voegeli was named to fill the newly created position of assistant director of engineering, tractor division, **Allis-Chalmers Mfg. Co.**, Milwaukee. He joined the company in 1935 and in 1948 was made agricultural tractor sales manager.

S. S. Battles, vice president of **Admiral Corp.**, Chicago, and vice president-general manager of its Galesburg, Ill., subsidiary, Midwest Mfg. Corp., resigns Dec. 31 because of ill health. **Lou Moos**, present plant superintendent at Midwest, will be general manager. **Claude E. Davies** was appointed regional manager for Admiral Corp. in the Seattle area.

Wagner Bros. Inc., Detroit, appointed **A. A. Schuenemann** sales representative for northern Ohio, located in Parma Hts., Cleveland. For the last seven years he has been associated with Udylite Corp. as a sales engineer in the same territory.

M. C. HARRIMAN
. . . mgr. merchant products at AS&W

M. C. Harriman succeeds **John W. Patterson**, retired, as manager, merchant products section, **American Steel & Wire Division**, Cleveland, U. S. Steel Co. **George H. Oltmann** replaces Mr. Harriman as assistant manager of the section.

H. M. Kirkby was appointed sales promotion manager, Steam Generator Division, **Clayton Mfg. Co.**, El Monte, Calif. He will have headquarters at Chicago.

Aetna-Standard Engineering Co., Pittsburgh, appointed **W. G. Hoffman** West Coast representative with offices in San Mateo, Calif.

Appointments in the special machinery division of **Kearney & Trecker Corp.**, Milwaukee, include: **Morris L. Hutchens**, chief engineer; **Harold W. Kippers**, sales manager; **Walter J. Hubbes**, superintendent; and **John P. Bunce**, staff assistant to **H. H. Lentzner**, division manager.

OBITUARIES . . .

Henry J. Crichton, 66, retired director of purchases for **General Motors Corp.'s** Truck & Coach Division, Pontiac, Mich., died Nov. 10.

Peter Peff, 56, president, **Superior Air Products Co.**, Newark, N. J. died Nov. 20.

Geoffrey R. Kinkead, 72, engineer at the Edgewater, N. J., plant of **Aluminum Co. of America** for the last 25 years, died Nov. 20.

Charles H. Babb, 53, president, **Babb Co. Inc.**, Glendale, Calif., died Nov. 13.

A. W. Wragby, 65, who retired last year as superintendent of coach production for **General Motors Corp.'s** Truck & Coach Division, Pontiac, Mich., died Nov. 17.

Joseph W. Early, co-owner and general manager of **Early Foundry Co.**, Dickson City, Pa., died Nov. 16.

Robert M. Hyde, 47, Chicago district manager for **Manning, Maxwell & Moore Inc.**, died Nov. 19.

C. B. Stoerkel, 57, owner, **Stoerkel Tool & Supply Co.**, Detroit, died Nov. 13.

Merrill L. Perry, 59, owner of **Conn-Perry Mfg. Co.**, Detroit, died Nov. 12.

Jacob Kissinger, 77, formerly secretary-treasurer, **Oil Well Supply Division**, U. S. Steel Co., died Nov. 14 in Los Angeles.

OSBORN

OSBORN ROTA-LIFT STEPS UP PRODUCTION from 20 to 90 molds per day

Saves one operator By installing Osborn's Rota-Lift, this foundry has increased mold output per manhour nine times. Formerly one molder and one helper produced only 20 molds per day. Now one man and no helper turns out 90 molds a day with the same pattern equipment. Molds are uniform, high quality throughout the day. Heavy physical effort has been eliminated.

Perhaps savings like these can be duplicated in your shop with Osborn's advanced molding methods. Have a factory-trained representative survey your requirements. From Osborn's complete line of molding machines and core blowers, he can recommend the most modern, efficient molding method for your particular operation. Write *The Osborn Manufacturing Company, Dept. 910, 5401 Hamilton Avenue, Cleveland 14, Ohio.*

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If you are designing shaft assemblies, bearing assemblies or counterbores in your products . . .

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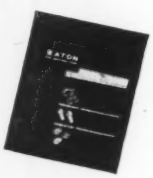
IF YOU ARE using conventional machining methods for mounting gears, pulleys and bearings on a shaft, you will want to take a close look at the savings you can gain with RELIANCE RINGS. Wherever there is a need for an external or internal shoulder on a shaft or within a tube, RELIANCE RINGS are the profitable answer. Why not call in a qualified Reliance Engineer for a close look at your present designs—his recommendations can cut your manufacturing costs—write us today.

Send for your free copy of Engineering Data Folder 4K/3 which completely describes the wide variety of Reliance Ring sizes and the types of carbon, alloy, stainless steel and non-ferrous Reliance Rings available.



EATON MANUFACTURING COMPANY, RELIANCE DIVISION

OFFICE AND PLANTS • MASSILLON, OHIO

SALES OFFICES: NEW YORK • CLEVELAND • DETROIT • CHICAGO • ST. LOUIS
SAN FRANCISCO • MONTREAL

Production AND Engineering NEWS AT A GLANCE

TITANIUM JOINING—Flash welding shows the most promise for joining the titanium alloys. Titanium has even been successfully flash welded to other materials. Flash welding is best accomplished by machines that facilitate rapid pickup and burn off to prevent excessive oxidation. In general flash welding results in a more ductile structure than inert arc welding because of forging action and inherent grain refinement of the process. In the case of the high strength materials, flash welding may be the only feasible way of joining.

THOUGHT PROVOKERS—Some serious thinking about these mass production techniques of ours will come out of the new heavy press program. Entirely new relationships between weight, force, stress and deflection limits mean that the engineering has changed. They are not just "large economy sizes" of today's smaller models. Some of the new presses are so large that component parts can't be fabricated in one piece by existing facilities. Laminated design is the answer to that one. The foundation that supports the total structure of two massive forging presses and accumulator station has a depth of 100 feet and is probably the largest excavation ever made for a machine installation. p. 76

MOTORIZED CIVILIZATION—About 200 million motors are at work in American homes, according to Westinghouse engineers. The average urban home uses from 12 to 15 units ranging from a 1/250-hp model used to drive record player turntables to the 3-hp unit in an air conditioner.

AUTOMATION VIA ATTACHMENTS—By adding two attachments, to a semistandard drilling machine, one company upped production 260 per cent. One of the attachments is an automatic cycle control device which sends the drill through its paces in drilling six holes in a hex head. The other is an automatic indexing system which rotates and positions the head for the drilling. p. 80

HOT OIL HELPS—Shop experience shows that hot oil quenching helps to get required hardness while holding dimensions of parts within permissible limits where the regular quench causes excessive distortion. It is being applied in low case carbonitriding, deep case carburizing and clean hardening of high carbon steels.

NEW CORROSION TEST—British Iron and Steel Research Association has found that a sulphur dioxide test for protective coatings gives reproducible results and fair correlation with outdoor exposure. Their test consists essentially of exposing panels inside a covered beaker containing a dilute solution of sulphur dioxide. Condensation of moisture on specimens is brought about by an electric heater and cooling coil. Panels are damaged by indentation and scratching before testing. The new test seems to simulate attack by industrial atmospheres better than salt-spray tests.

EYES ON PLATING—It's generally conceded that more voltage is required to plate many metals than should be required theoretically. At Western Reserve University they're studying the fundamentals of what is involved when a metal-ion in solution is converted to an atom in a plated metal crystal lattice. More research in the same field is now going on and there's promise of better results with more efficient plating methods in the future. p. 82

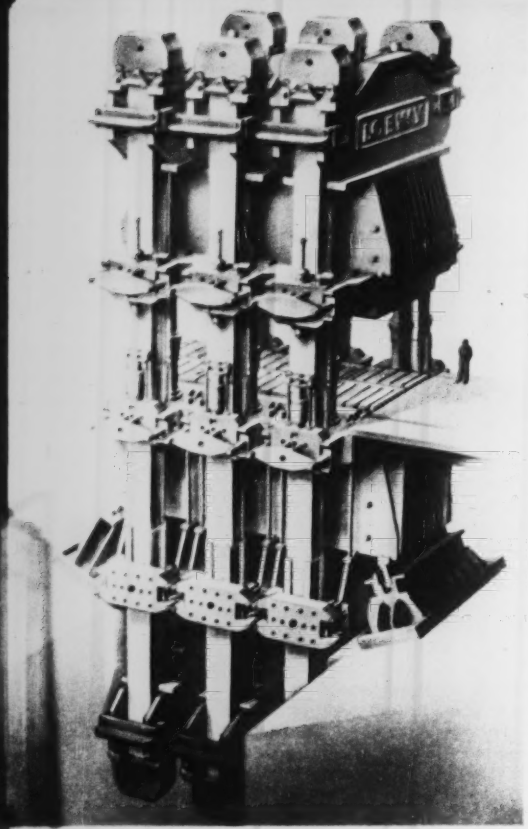
NYLON UNDER IMPACT—Nylon's ability to deform slightly to absorb shock makes it the choice of materials in gears and other applications where impact loading is encountered. This property enables nylon gears to mesh with metal gears and to iron out any irregularity in the gear teeth. Incidentally, when nylon is rubbing against steel, the limiting load is 550 psi without lubrication. Water lubrication will increase this limiting load 91 per cent; SAE 10 oil will increase it 182 per cent.

IN MINIATURE—A new mill in Sharon, Pa., is thought to be the first continuous weld pipe mill ever completed in this country for the explicit purpose of making ⅛, ¼, and ⅜-inch buttweld sizes in the full range of standard, extra-heavy and galvanized grades. Buttweld is delivered to the hot saw and cooling bed at the rate of 700 fpm. p. 90

ATOMIC INDUSTRIAL TRUCKS—With some atomic propulsion units already being built other possibilities are being studied or talked about. One of the latest predictions for the use of atomic energy in vehicular propulsion deals with its application to electric industrial trucks. An engineer for one of the industrial truck builders expects conversion of nuclear energy to electrical energy without intermediate mechanical means to be achieved with atomic conversion units replacing storage batteries. Every operator will probably carry an industrial-type Geiger counter in his pocket and want a risk pay premium.

METALWORKINGS—Loading a truck in 20 minutes instead of 1½-hours—is made possible by drop bottom boxes (p. 110). The system also boosted stamping output 15 per cent . . . Hitting a forging blank from both sides while it's suspended in mid-air—and it's vibrationless—is the essence of "Impacting" (p. 89).

Metalworking Outlook—p. 39 *Market Outlook—p. 153*



Closed die forging press with 50,000 ton capacity is one of the two being built. These are the program's biggest

Heavy Presses Challenge Industry

By ALEXANDER ZIETLIN
Vice President
Hydropress Inc. and Loewy Construction Co. Inc.
New York

Giant forming machines are taking shape after much speculation and discussion. Their impact on industry may bring changes in accepted production techniques

INTRODUCTION of the new heavy hydraulic presses to American industry has caused and is expected to cause more serious thinking about our mass production techniques. These powerful die forging and extrusion presses, with capacities far beyond the dreams of production engineers, will fabricate a variety of structural members from ferrous and nonferrous metals such as carbon and stainless steels, aluminum and copper and their alloys.

While these gigantic machines, sponsored by the U. S. Air Force, are being built primarily to increase air-frame production, especially for the new jet and turbojet planes, there is every indication that civilian output of capital and consumption goods will benefit by the new production techniques provided by these new tools.

Old but New—The phenomena of hydraulics has attracted the attention of man from the earliest civilizations of China, India, Persia and Greece. There, water for irrigation and human needs had to be conducted considerable distances and raised from lower to higher levels.

Three hundred years ago Pascal formulated the basic principles of hydraulics which today are the basis of power for the 50,000-ton capacity die forging presses and 20,000-ton capacity extrusion presses. While presses of this size are not to be regarded as ultimate limits by any means, the problems posed before all branches of the engineering profession by the heavy press program of the Air Force are of a fundamental nature and require original and creative thinking on the part of leading specialists in various engineering fields.

Following categories cover several of the main aspects of designing, fabricating and erecting such huge presses:

Design—It should be noted at the outset that if the problem were merely to make larger models of existing presses then the engineering feat would not be stupendous. Since we have a 16,500 ton capacity forging press brought over from Germany, could we not construct one of 50,000 tons capacity by making the components roughly three times as big?

The answer is, of course, no. The relationships between weight, force, stress and deflection limits of the new larger presses cannot be stated as simple ratios of these factors as applied to the smaller presses. The philosophical concept that the total of any complex unit is more than the sum of the individ-

Site of the 50,000 and 35,000 ton forging presses showing excavation needed to accommodate foundations for presses

General pit area for presses at Wyman-Gordon. Foundation is 100 feet deep. Supporting walls are up to 13 feet thick

ual parts holds good in this application. These machines contain a series of interdependent relationships which can not be considered as separate items. One major change brings a chain reaction.

Designers and engineers started with some fundamental questions:

1. What do the operators want from these huge presses? Basically, they want versatility, reliability and efficiency. The press must not be limited to one particular item nor must it require excessive servicing.
2. Granted that such hydraulic presses can be designed to operate according to these specifications, can the components be fabricated? For example, the columns, (tie rods) in the 50,000 ton capacity forging press are 110 feet long and weigh 320 tons each. Do we have the means to fabricate such pieces?
3. If such components as these columns can be fabricated, can they be transported to the press site?
4. Can these items be erected with equipment readily available?
5. Will servicing or replacement be a comparatively simple matter?

Creative thinking necessary to answer such questions is illustrated by the approach made in the case of the aforementioned press columns.

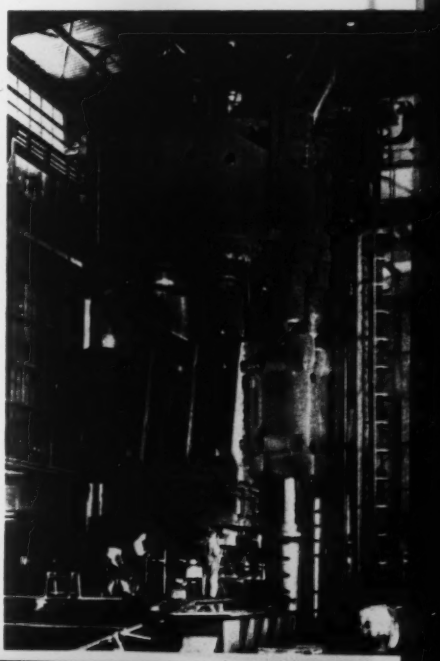
Columns of the required size stated above cannot be fabricated in one piece by existing facilities. Therefore, the decision was made to use a laminated design. The final design was based on a rectangular laminated construction instead of the conventional cylindrical shaped one-piece type. This unique method solved the transportation and erection problems too since each section of the column can be transported separately and then assembled piece by piece on the press. Even so, special flat cars supplied by the Pennsylvania Railroad are required for these forgings.

Stress Analysis—When one considers the extraordinary forces involved in hydraulic presses of the capacities mentioned, the need to be certain that the individual parts will withstand the stresses resulting from these forces is readily understood. Therefore, a group of stress analysts check every major component before fabrication. In addition to the standard empirical and rational formulas employed, extensive use of photo-elastic studies with plastic models gives experimental proof of the designs' soundness.

Vibration—High stability of the newly designed die forging presses is achieved by placing the main cylinders, piping, static support and spacer beams below the operating floor of the press. This arrangement results in a lower center of gravity for the whole structure, a very desirable feature.

The problem of vibrations in such structures is a complex one and can be considered as follows:

Vibrations normal to the long and short axes of the press with and without off-center die loading conditions must be safely controlled. Basic and higher frequencies must be ascertained in



Biggest press built to date is this German unit rated at 33,000 tons and now operating for Russia's war machine

Immense forgings required for presses require operations like Midvale Co.'s dual furnace pouring of huge ingot

order to prevent resonance due to outside forces.

This matter is being studied by means of mathematical and experimental research.

Design of Die Sets—The chief function of the die sets in a forging press is to distribute the applied load to the press bed within preset limits and to prevent mismatch due to side thrust. The bed of the 50,000 ton capacity press is 33 feet long by 12½ feet wide. With such dimensions and forces the die set design must be more than an approximation.

Question confronting the designer is: "What is the minimum size of the die set which will distribute the die loading effectively?" A fixture weighing some 250 tons certainly makes the designer's goal of the most efficient and economical design not an easily solved problem. The combined use of all engineering tools as calculus, stress analysis, photo-elastic tests etc. becomes a must.

Metallurgy—Research never ends for alloys used in press tools that must withstand the pressures and temperatures now demanded. For example, the extrusion process which started with solid shapes from nonferrous metals now has reached the stage where steel alloy billets are being extruded into one-piece hollow propeller blades and even large gun barrels. The temperature required for such steel alloy extrusions is close to 2300° F and the press parts in contact with such billets must be able to withstand the effects of the temperature, pressure and abrasion involved. The use of tungsten steel for the extrusion press dies did not yield the life-expectancy desired and at the present time the dies are made from chromium steel then faced with cobalt-chrome tungsten. The Ugine-Sejournet process of salt treatment and glass lubrication, developed in France, is a big factor in the longer life achieved in the extrusion press tools such as the container liner, mandrel, dummy block and dies.

Material Handling—The production capacity of these giant presses cannot be maintained unless the means of conveying the material to and from the press is integrated into the general design. The low pressure fast-advance stroke, the high pressure power stroke and the return stroke consume together only 15 per cent of the time required for a complete operating cycle.

This means that material handling is a major time factor and that the designers must use mechanical and automatic devices to avoid delays between the processing steps of the billets and removal of finished products. This includes conveyors to heat-treating furnaces, salt baths, quenching tanks, cooling and inspection rooms.

Accumulator Stations—The accumulator stations are the power units for operating these hydraulic presses. These accumulator stations are major projects in themselves. This is particularly true in the case of the 35,000 ton and 50,000 ton capacity forging presses which are located in one building. The accumulator station for this dual installation will consist of:

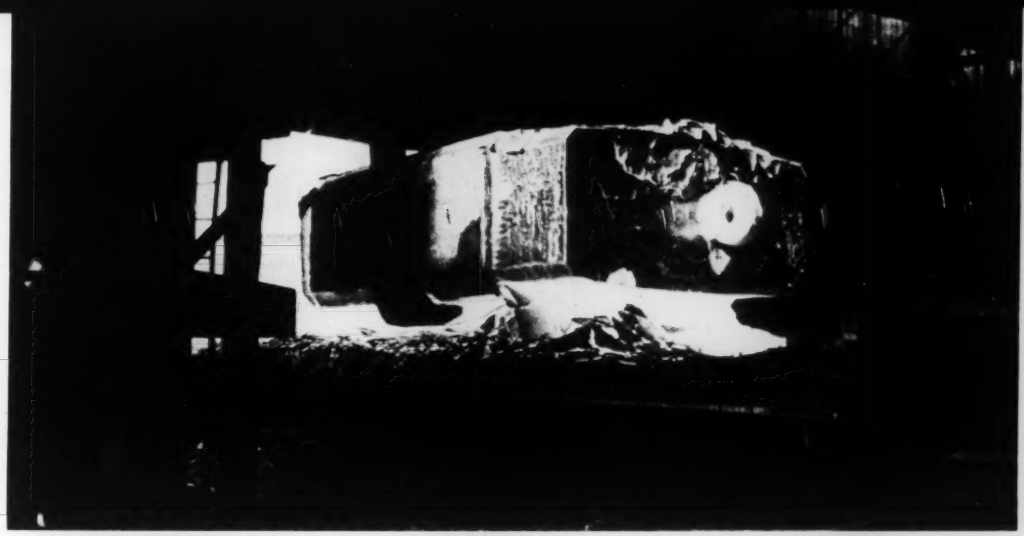
1. Eleven hydro-pneumatic accumulator bottles with a total volume of 4000 cubic feet
2. Seven hydraulic pumps rated at 1500 hp each or a total of 10,500 hp.

Hydraulic medium is water rather than oil. The hydraulic pumps force water into the accumulator bottles under a head of compressed air at 4500 psi. It is this pressur-

Heavy Press Program Reviewed

PRESS CONTRACTOR	PRESS SIZE, TYPE (TONS)	TO WHOM AND WHERE
Mesta Machine	(1) 50,000, forging	Alcoa, Cleveland
United Engineering & Foundry	(1) 35,000, forging	Alcoa, Cleveland
	(1) 35,000, forging	Harvey Machine, Torrence, Calif.
(To be built by Lombard)	(1) 20,000, extrusion	Harvey Machine, Torrence, Calif.
(To be built by Lombard)	(1) 12,000, extrusion	Reynolds Metals, Phoenix, Ariz.
Baldwin-Lima-Hamilton	(1) 25,000, forging	Harvey Machine, Torrence, Calif.
E. W. Bliss	(1) 35,000, forging	Kaiser Aluminum, Newark, O.
	(1) 25,000, forging	Kaiser Aluminum, Newark, O.
Loewy Construction	(1) 50,000, forging	Wyman-Gordon, Worcester, Mass.
	(1) 35,000, forging	Wyman-Gordon, Worcester, Mass.
	(1) 25,000, extrusion	Bohn Aluminum, Adrian, Mich.
	(1) 20,000, extrusion	Alcoa, Cleveland
	(1) 12,000, extrusion	Curtiss-Wright, Buffalo, N. Y.
	(2) 8,000, extrusion	Kaiser Aluminum, Halethorpe
	(1) 8,000, extrusion	Reynolds Metals, Phoenix, Ariz.
	(1) 8,000, extrusion	Harvey Machine, Torrence, Calif.

In addition Loewy will complete engineering work on a 75,000 ton forging press and a 25,000 ton extrusion press.



Ingots like this 405,000 pound giant coming out of heating furnace prior to going under 14,000 ton forging press at Midvale Co.'s plant are not uncommon

ized water that provides the energy for the high pressure hydraulic systems.

Accumulator bottles have a capacity of 350 cubic feet and their laminated walls are over 8 inches thick.

Foundation — The foundation that supports this total structure of two massive forging presses and accumulator station has a depth of 100 feet and is probably the largest excavation ever made for a machine installation. The supporting walls of concrete reach a thickness of 13 feet. While the 50,000 ton capacity forging press reaches a height equal to a ten-story building the lower half is below ground level, suspended over this deep pit.

Controls—In the comparatively small hydraulic presses now in use the operator controls the machine by means of 3-foot long control levers aided by simple gages, plus his senses of sight, sound and feeling. He is like a man who grows accustomed to his automobile and can recognize an abnormal action by the feel of it.

These gigantic machines preclude such rule of thumb methods. The operator must depend upon instruments to provide specific and instantaneous information on the press reactions during the power stroke in order to control the press. The die forging presses will incorporate a new system of controls which utilizes electronic aids and servo-mechanisms.

No Commercials—The operator will look at the grid of a cathode ray tube just as if it were a television screen. The pattern and center of the press loading will be portrayed. The electrical impulses emitted by a series of strain gages will be amplified and should any resultant force be greater than the preset figure the signal will activate an automatic shut-off switch and stop the press.

Large cumbersome hand levers will no longer be a source of physical exertion to the operator. Servo-mechanisms will provide finger-tip control of these huge machines.

Operating Personnel — The ingenious controls designed to provide safe operations of these presses do not eliminate the human element. The operating personnel for these new presses will undergo special training since previous experience with hydraulic equipment cannot be assumed to be a sufficient guide.

Men who will be responsible for the control of such power hitherto unreached in machine tools, must understand thoroughly each step in the forging and extrusion press operations. Theoretical knowledge must be combined with practical intelligence in order to take full advantage of these presses.

Future Holds Promise—It is difficult to visualize the full effects that these presses will have in the engineering world. Items now made by riveting, bolting or welding two or more units together will be forged or extruded in one piece. Not only will there be a significant savings in material and labor but the finished product will have superior strength characteristics because action of the die causes the grainflow of the metal to follow the contour of the object.

Capacity of these presses to convert raw materials, particularly aluminum, to finished products is so high that in order to maintain economical production the supply of raw materials must keep pace. The increased production of aluminum sponsored by government agencies fits into the overall program to good advantage.

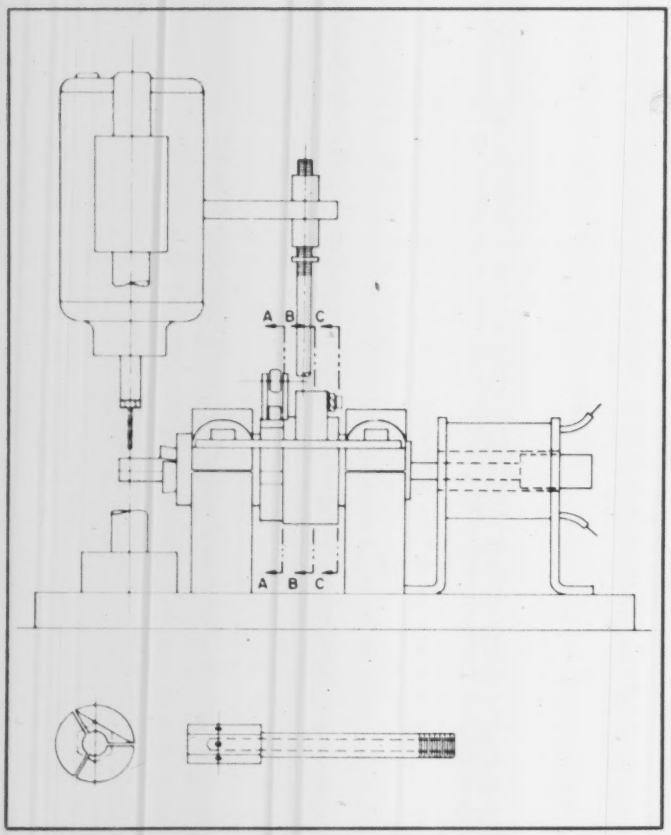
The successful completion of the heavy press program will, we believe, justify the action of the U. S. Air Force in sponsoring this industrial program. There is no doubt that American engineering prestige will reach a new high when these presses go into production and the designers of military and commercial aircraft as well as designers in all other lines of manufactured goods will have at their disposal new methods and new facilities to satisfy their incessant quest for improvement and progress.

AUTOMATIC ATTACHMENTS:

Drill Makes Chips Fly

Aimed directly at reducing manual handling time, design for a new machine called for automatic cycle control plus automatic indexing. Output is up about 260 per cent

By FRANK M. BUTRICK JR.
Consulting Tool Engineer
Alma, Mich.



Drawing of machine shows how automatic control and indexing mechanisms are located in relation to the drill. Bottom view illustrates the holding and locating device

WHETHER YOU'RE on the right or wrong side of the break-even point in manufacturing operations often depends on the efficiency with which the detail operations are performed after the majority of the work is finished.

Good example of this is in screw machine products where secondary operations must be performed after the part has left the first machine. A Michigan specialty shop streamlined one of the "nuisance" operations.

Six Holes—Part is made of phosphor bronze hexagonal bar stock, with the initial operations of turning, threading and drilling done on a Brown & Sharpe 00 screw machine. After leaving the screw machine the part has six No. 31 holes drilled radially, one on each of the flats of the hex head.

Originally this was done on a drill press, the part being indexed manually in a six-position collet-type fixture. The drill was fed by a foot pedal. Maximum production achieved on this setup was 250 pieces per hour.

The Goal—New machine was designed with one primary purpose in mind: To make as much of the operation automatic as was possible and yet to avoid investing in a six-head drilling machine. Best solution was found in a machine with automatic feed, automatic indexing and automatic ejection of the finished part.

Machine consists of a base plate with two guide posts at one end on which the drill itself slides. A

holding and indexing fixture is in the center and a solenoid actuating the workholding collet is at the other end.

Air Operated—Drill is a small high-speed self-contained unit riding on guide posts on two steel bushings fastened to the drill housing. Drill is fed and retracted by an air cylinder mounted overhead. A Jacobs collet chuck holds the drill.

The workholding and indexing group is built around a hollow spindle riding in two supports furnished with tapered roller bearings. Collet lies within this spindle and grips the work around the turned stem.

With a Snap—From the rear of the collet a steel rod extends out and through the solenoid behind the spindle. On the end of this rod is a soft iron core for the solenoid. When the solenoid is energized this core is drawn into the coils about $\frac{3}{4}$-inch driving the collet forward against its spring and releasing work held by collet.

Action has enough snap to throw the work clear of the collet, eliminating manual unloading. To properly locate the drill in relation to the flats on the work, the work is aligned by a lip on the collet which slides over one of the flats on the work. The collet spindle, and index wheel are keyed together. Precise adjustments are made by adjusting the length of stroke of the indexing cylinder.

Control Device—Mounted on the spindle directly behind the index wheel is a round cam with a flat milled into it. A long spring rides on this cam, operating two microswitches which control the cycling of the machine. When at rest the end of the spring lies in the flat of the cam.

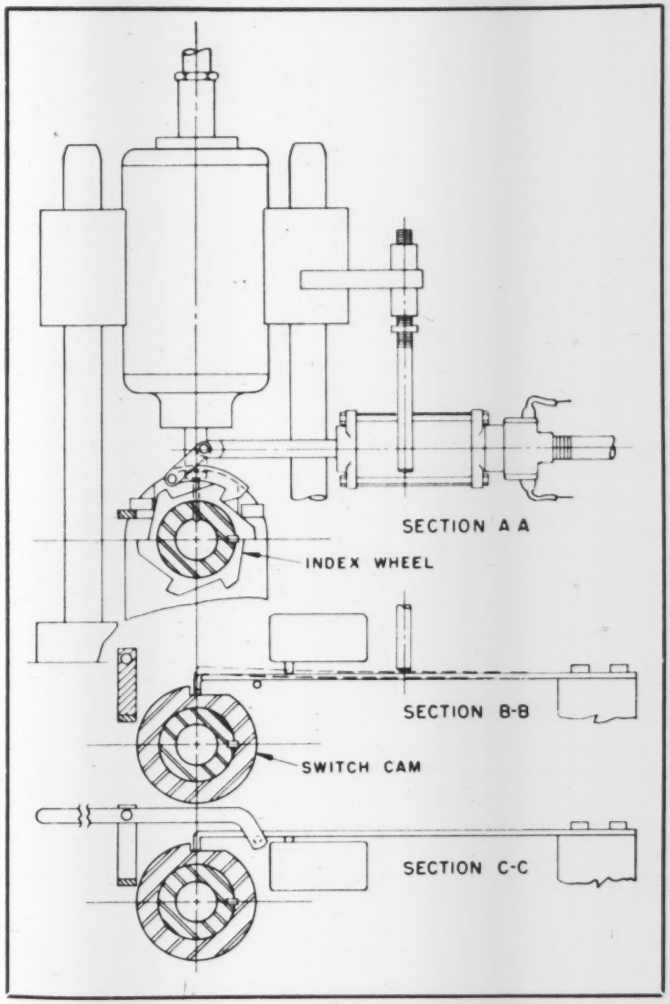
One microswitch is mounted directly below the spring so that in the at rest position the switch is closed. This switch operates the solenoid and holds the collet open in this position.

The Commencement—To begin the cycle, the operator depresses the end of a lever extending toward him. This raises the spring from the flat on the cam and allows the lower switch to open, deenergizing the solenoid and allowing the collet to be closed on the workpiece by its spring. Raising the long spring also closes a switch mounted directly above it. When this switch is closed, the index cylinder snaps out to index the spindle and work and snaps back.

At the same time, the drill is fed down to the work and drills the first hole. A rod attached to the drill deflects the spring sufficiently to open the switch when the drill has reached full depth.

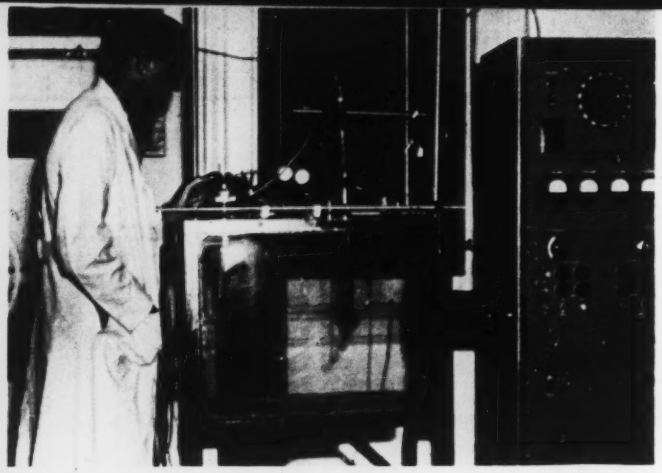
When this switch is again opened, the drill is retracted, pulling the rod away from the spring. This allows the switch to close thus indexing the piece, and drilling the next hole. When all six holes have been drilled the spring drops off the round cam onto its flat, leaving the upper switch open the drill and index cylinders retracted, and closes the lower switch which releases and ejects the finished workpiece.

One operator can run 650 pieces per hour on one machine and 900 to 1000 per hour by operating two machines simultaneously.



Sectional views illustrate index wheel and switch cam. When lever drops into milled flat on cam, the switch is thrown, stopping the cycle and ejecting the piece

PLATING METHODS EXPLORED



Tank with ultrasonic generator used at Western Reserve for studying effects of sound waves on copper plating

Fundamental investigations discussed by electrochemists at their Montreal meeting will form basis for new and practical plating developments

ELECTROPLATERS generally are aware that a considerably higher voltage is required to plate many metals than should be required theoretically.

A part of a general research program on electrode processes at Western Reserve University, direct attack has been made on the question of what is involved when a metal ion in solution is converted to an atom in a plated metal crystal lattice.

Findings were given in a report by John Yeager, Ernest Yeager, and Frank Hovorka at the recent meeting of the Electrochemical Society held in Montreal, Oct. 26-29. Mechanism of plating and new plating applications highlighted many other discussions on electrodeposition, also featured at this meeting.

Experimental work at Western Reserve was centered around a study of potentials for copper and nickel as a function of such variables as current density, time, pH, electrolyte concentration, and temperature. These data, together with x-ray diffraction results and current efficiency measurements, show that the excess voltage or polarization for nickel is associated with the actual discharge of the metal ions to metal atoms across the solution interface rather than to any of the other steps which have been postulated, such as the freeing of the ions from water of hydration or the rearrangement of the metal atoms to yield a stable lattice configuration.

Practical Side — Such research may sound quite academic to the electroplater. However, the results are a prerequisite to fundamental understanding of the role of addition agents so important in present-day bright plating processes, and, even more important, to predicting what materials offer the greatest promise as new additives.

Brightness is an important property of an electroplate for decorative use. Addition agents may also be employed which have smoothing ability. In this respect, a semi-bright nickel bath is more effective than the bright nickel bath.

Sound Effects — What happens when ultrasonic waves are used in copper plating was examined in other studies conducted at Western Reserve. Results indicate that such sound waves, employed at frequencies of 200 and 100 kc sec, produce structural changes in copper plated from the common acid sulphate type bath. They also decrease the potential associated with the plating process.

This study was carried out in large tanks of the type shown in the photograph with considerable attention aimed at getting accurate information on the acoustical amplitude as well as the electrochemical parameters.

X-ray diffraction patterns show that copper deposited in the presence of ultrasonic waves tends toward preferred orientation and in some instances, gives smaller grain sizes, according to the report on the investigation given by W. R. Wolfe. Similar changes of small magnitude can be produced by high speed agitation of the bath.

Micro-agitation associated with moderately intense ultrasonic waves is considerably more effective than ordinary mechanical agitation in reducing the concentration gradients at surface of work being plated.

Lack of frequency dependence of the observed effects suggests that lower frequency ultrasonic waves which can be produced more economically might be equally effective. Ultrasonic waves offer considerable promise in specialized plating operations where concentration gradients at the work surface must be kept to a minimum.

Bright Copper Mechanism—Better understanding of mechanism of

bright copper plating motivated studies at Wayne University, the results of which were reported to the electrochemists by Dan Trivich. The acid bath of the type developed by General Motors for bright copper plating was used in the investigation. This bath consists of copper sulphate and sulphuric acid with thiourea as the brightening agent.

Why Bright — Existing theories on bright plating were reviewed. One of the earliest efforts to explain the effects of brightening agents was the reducing menstrum theory. It postulates that the organic substance forms a solution film around the cathode, and that it is this reducing property that facilitates the discharge of metal ions. However, it is now known that these compounds couldn't be more reducing than the cathode itself.

A second theory is that brightening agents are either colloids, or they form colloids in the solution, and these colloids are adsorbed by the metal in such amounts as to prevent the further growth of the crystals and thus cut down their size. The resulting deposit is finer-grained and smooth because it consists of many small crystals rather than a few large ones.

Another theory, known as the complex theory, states that the brightening agent forms complex ions with the metal ions in the bath.

A more recent theory for bright plating is the cathode interference theory. It states that the crystalline structure of the electrodeposited metal is governed by the ratio of the metal ion concentration in the cathode film to the concentration of the other constituents.

Thus, if the proportion of the metal ions to the inert particles is comparatively high, there will be little interference with crystal growth and coarsely crystalline deposits will result. If, however, the proportion is low, either due to a low degree of dissociation, complex formation, high hydration of ions or the presence of colloid matter that has migrated into the cathode film, then there will be considerable interference with crystal growth, with frequent formation of new nuclei.

Weakness — One common fact that none of these theories can explain, as pointed out by Dr. Trivich, is the specific nature of the particular brightening agents so important in present-day plating processes.

New Approach—Dr. Trivich and co-workers at Wayne University postulated that brightening of plated deposits is primarily the result of adsorption.

There may possibly be two types of adsorption. One was called the structural sensitive type, that is, the adsorption of the brightener molecule is selective.

For plating experiments along this line single copper crystals, spherical in shape, were used. In the sphere all possible shapes are exposed. If preferential adsorption should occur, then the crystal sphere would provide for all possible surface structures with different atomic distances.

Spherical single crystals of copper of a diameter of approximately one half inch were plated. These were machined from copper single crystal slugs made from a resistance furnace with a moving crucible as well as from an induction furnace with a stationary crucible —a technique which has recently been developed.

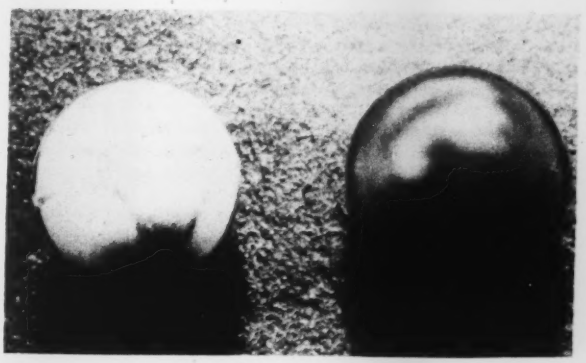
The second type of adsorption was termed current density sensitive, that is, the adsorption of the brightener compound molecules on the cathode surface occurs whenever a sufficiently strong electric field is applied irrespective of the nature of the crystalline structure of the cathode.

This may explain the smoothing action obtained in certain plating baths. Thus, the low current density areas grow faster than the high current density areas because the latter are blocked by these compounds. The polarographic method with dropping mercury electrode was used to study this phenomenon.

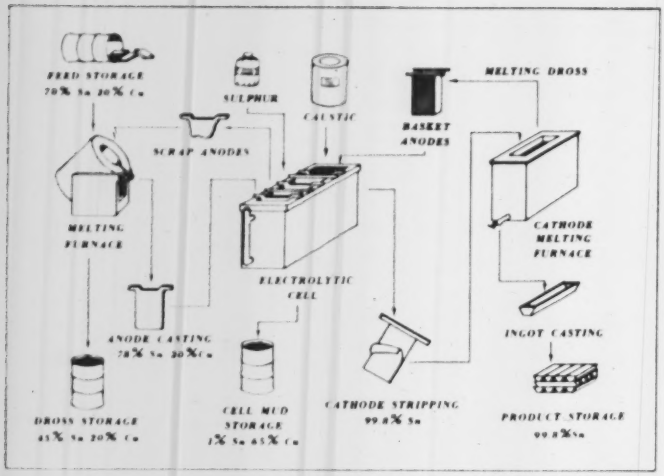
Tracer Method—Adsorption studies were made using the thiourea addition agent containing radioactive sulphur (S^{35}). These tests showed that adsorption occurred, but was not selective.

Plating tests were made in a practical bath containing 205 grams per liter copper sulphate, 48.8 grams per liter sulphuric acid, with and without thiourea addition agent, at a current density of about 50 amp/sq ft. In the case where thiourea was absent a distinctive, definite and reproducible matte pattern was developed. Test spheres plated in the bath containing thiourea come out uniformly for all lengths of time and in a wide range of current densities.

Leveling with Copper—When periodic reversing of plating current is used, known commercially as PR plating, chief interest is making plated surface smoother than the base metal. Studies on anodic reactions following current reversal in cyanide copper plating, conducted in Westinghouse laboratories by D. R. Turner, have indicated that leveling during plating is an anodic phenomenon.



Single copper crystals plated at Wayne University in investigating mechanism of bright copper plating



Refining process for treating tin scrap having a high copper content developed by the U. S. Bureau of Mines

Surface leveling obtained with periodic reverse current cyanide copper plating was attributed to the rectifying properties of a cuprous oxide barrier layer formed during the anodic part of the cycle. Anodic dissolution occurs by means of cuprous ions diffusing through breakdowns in the barrier layer. Breakdowns are more frequent at projected surface areas. The greater rate of anode dissolution at these points produces a leveling action.

Plating bath used by Turner in these studies was the potassium type cyanide copper solution containing about 8 ounces per gallon copper, 1 ounce per gallon free cyanide, and 5 ounces per gallon potassium hydroxide. Factors which promote optimum leveling characteristics are: 1. High deplating current density, 2. long deplating time, 3. low free cyanide, and 4. high hydroxide content. Steel having an initial roughness of rms 12 microinches, as measured on Brush surface analyzer, showed rms in range of 3 to 4 microinches after plating with 0.001-inch of copper.

Plating on the New Metals—Procedures for treating zirconium, beryllium, and titanium so they can be plated were described at the meeting.

As plated adhesion of about 6000 psi on zirconium is obtained by prescribed etching of the surface prior to plating, according to a procedure developed by Battelle Memorial Institute. According to a report by John G. Beach a suitable etching composition consists of a solution of 32 grams per liter ammonium fluoride plus 15 grams per liter of hydrofluoric acid. Suggested dip time is 45 seconds which removes about 0.6 mil of zirconium from the surface.

Preferred procedure is to plate with 1-2 mils of nickel from the low pH Watts nickel bath following the etching process. Prebaking of plated parts at 400° F, to remove hydrogen, followed by heat treatment at 1300° F, for 10-45 minutes, produces alloy bonds of about 50,000 psi as indicated by modulus of rupture tests. About 0.5 mil of nickel plate goes into the diffusion layer. Other metals may be electroplated over diffusion bonded nickel or iron plate.

Beryllium — Two methods for plating on beryllium were developed in work also conducted at Battelle. John G. Beach and Charles L. Faust dealt with this problem in a paper before the Montreal meeting.

One method involves electrochemical and chemical activation of the beryllium for direct plating with other metals.

First step is anodic treatment in a solution of 10 per cent phosphoric acid (85 per cent), plus 2 per cent hydrochloric acid (38 per cent), at room temperature, at about 50 amp/sq ft, for a period of 2 minutes. Beryllium parts are tranferred directly from the anodic etch bath to a concentrated nitric acid pickle, followed by rinsing, and plating in a mildly acidic bath. If parts are to be plated in an alkaline bath, they should be given an additional pickle in an ammonum sulphate solution acidified to pH 2 with sulphuric acid.

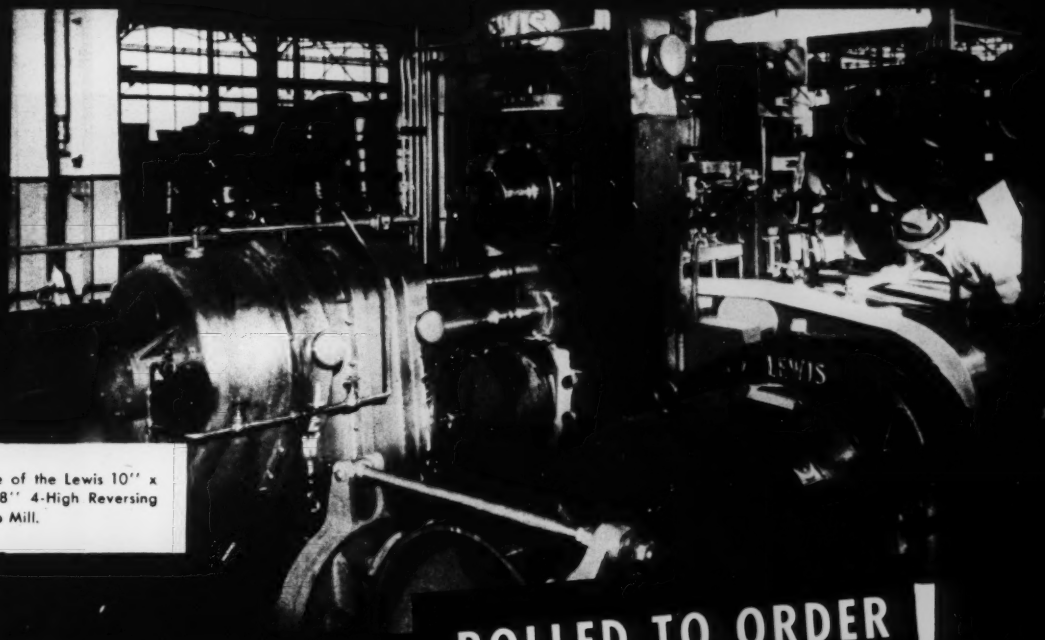
The second method for plating on beryllium devolped in the Battelle studies is based on pretreatment to produce an intermediate zinc film. Procedure is essentially the same as is employed commercially for plating on magnesium, except that the zinc pretreatment solution for beryllium is used in the pH range 7-8 rather than around pH 10 which is recommended for plating on magnesium. Five minute treatment at 180° F is satisfactory to prepare the beryllium surface for plating.

Titanium—Although it is an active metal, titanium is normally covered with a stable and adherent oxide film. It is more difficult to plate than aluminum and magnesium. Conventional methods of preparing these metals for plating, when used for titanium, will not give adherent coatings. Based on work conducted at Armour Research Foundation, good adhesion of plated coatings on titanium is obtained by subjecting it to an anodic etch in an essentially nonaqueous bath, consisting of hydrofluoric acid and ethylene glycol, prior to plating.

Recover Tin—An electrorefining process has been developed by the Bureau of Mines to treat tin scrap having a high copper content. (See flow sheet).

The conventional thiosulphate plating bath is used. However, the use of expensive thiosulphate and tin chloride is avoided by preparing the bath with caustic soda, salt and sulphur. According to a report at the meeting a plant to produce 1000 pounds of refined tin a day has been built and operated successfully for a period of 10 months.

Electrogalvanizing from Fluoborates—Studies have been made at the Indian Institute of Science, Bangalore, India, to determine the



Entry side of the Lewis 10" x 20" x 28" 4-High Reversing Cold Strip Mill.

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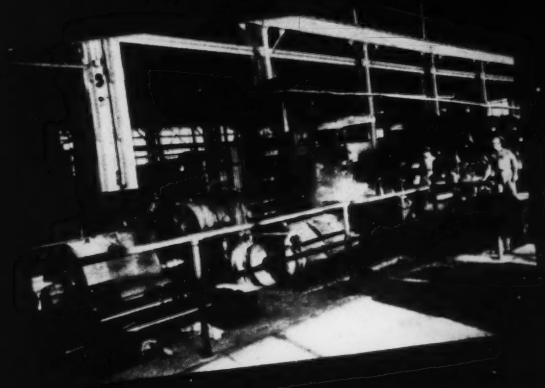

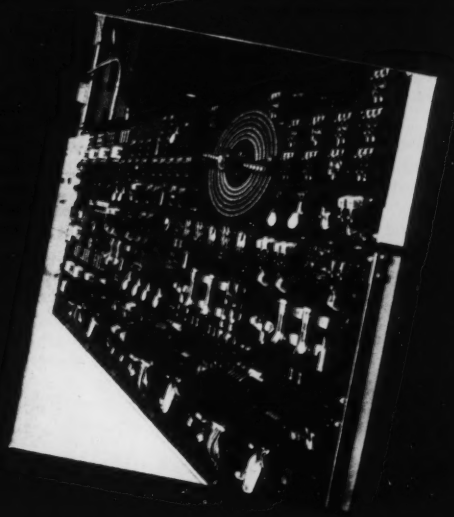

When Production Steel Coil Co. Inc. gets a request for cold rolled strip of unusual width, gauge, temper and finish, they don't put the customer off with a "not in stock" excuse. They roll the order to exact specifications right in their Detroit warehouse on a Lewis 10" x 20" x 28" 4-High Reversing Cold Strip Mill! Reversing coils permit continuous operation with substantial reductions per pass, and close gauge tolerances are maintained with the most advanced pushbutton controls. This mill, together with its annealing equipment provides an exceedingly flexible arrangement that meets all customers' requirements. Write for complete technical details.

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optimum conditions for electroplating zinc from a fluoborate solution. The investigators looked at a number of different baths and recommended the following composition in a paper before the electrochemical meeting.

FLUOBORATE ZINC PLATING BATH

Zinc fluoborate	180 g/l
Zinc (metal)	49 g/l
Ammonium fluoborate	30 g/l
Boric acid	25 g/l
Beta naphthol (addition agent)	1.0 g/l
pH	5.0-5.4
Temp.	room
Cathode current density	40-9 amp sq ft

Quality of zinc deposit from the fluoborate solution was satisfactory over a wide range of plating conditions. Addition of 0.5 to 1.0 grams per liter beta naphthol to the bath gave a fine grained deposit of good appearance.

Cathode current efficiency of the zinc fluoborate solution was near 100 per cent. Anode efficiency varies from 100-110 per cent, being influenced appreciably by the pH of the solution.

Limiting current density for satisfactory plating is high. This property increases with increase in concentration, temperature and agitation. Using a concentration of 180 grams per liter of zinc fluoborate, at room temperature, the limiting current density for still plating is about 95 amp sq ft. The bath was also recommended for barrel plating.

The discussion of the paper brought out the fact that zinc fluoborate is being used in this country for electrogalvanizing wire. One advantage over the conventional sulphate type bath is better conductivity, allowing higher production with existing generator capacity.

Refining Antimony — Antimony has been refined on a fairly large scale in work of Canadian Department of Mines and Surveys by: 1. Electrodeposition from a chloride bath using a rotating cathode, 2. vaporization and condensation and, 3. using a combination of these two methods.

Method to be used in any particular case should be determined by the nature and amount of the impurities in the crude antimony and by impurities permissible in the refined antimony.

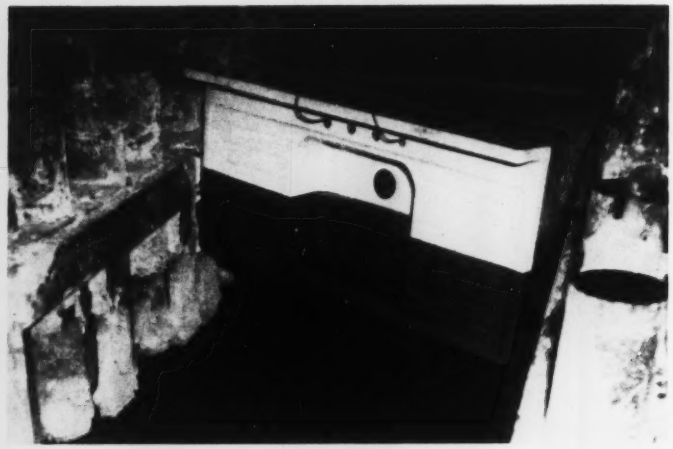
Conditions for plating antimony used in the Canadian production operation were as follows:

BATH COMPOSITION

Antimony trichloride	14 g/l
Free hydrochloric acid	116 g/l

CONDITIONS

Temperature — room	
Cathode current density	30-40 amp sq ft
Cathode peripheral speed	100 surface inches/min
Cathode efficiency	Nearly 100 per cent



Refinishing Without Sandblasting

Vitreous enamel is removed from damaged parts, such as the sink top above, without sandblasting by this fused-caustic process. Prior to refinishing, a 4-minute submersion at 800 to 900 F cleans 0.014 to 0.017-inch porcelainized surfaces. Patented in 1894 in the U.S., the method was economically unfeasible until recent development by Diamond Alkali Co. and Cleveland Metal Cleaning Co.

Computers: New Design

COMPUTERS are being used as engineering design tools to shape new plants and convert old ones, J. P. Bishop, manager, Special Products Division, Beckman Instruments Inc., S. Pasadena, Calif., reported at the annual meeting, American Society of Mechanical Engineers.

Such design computers, using the accuracy, speed and versatility of electronic circuits, operate as miniature models of the real systems to be designed, Mr. Bishop explained. Their variables, transformed into electronic quantities, change relatively as do those in a real plant.

Experimental Verification — Design investigations are being carried out on whole and partial plants, on detail designs common to all plants and on experimental verification of theories. Mr. Bishop continued, "The cost of the versatile design computer able to do this is now so low that amortization can be made within a year or two."

He pointed out that in the process industry, the characteristically continuous flow of product minimizes nonlinearities, thus making it an ideal field for the initial use.

Mr. Bishop presented several examples to demonstrate the step by step procedure used in designing difficult control systems for process plants, and stated that many comparisons of predicted and actual results confirm the validity of the method.

Stainless Pumps Hot Stuff

Stainless steel pumps capable of moving fluids at pressures to 70 psi, and said to safely handle corrosive and hazardous fluids such as nitric acid and hydrogen peroxide, are a development of Eco Engineering Co., Newark, N. J.

Equipped with chemically inert teflon impellers, a teflon packed stuffing box and a choice of teflon or graphitar self-lubricating bearings, the pumps are self-priming for nonvolatile fluids. They are reported to provide the highest suction lift over widest temperature and viscosity ranges.

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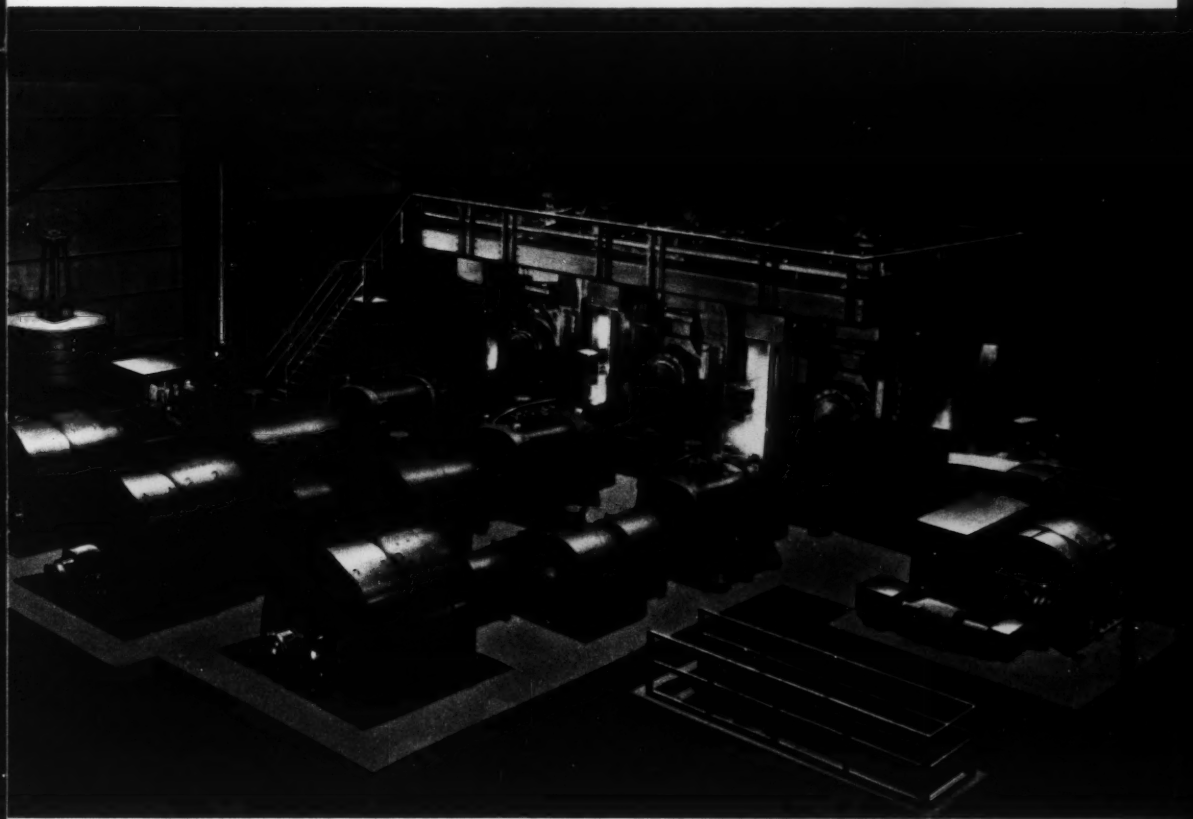

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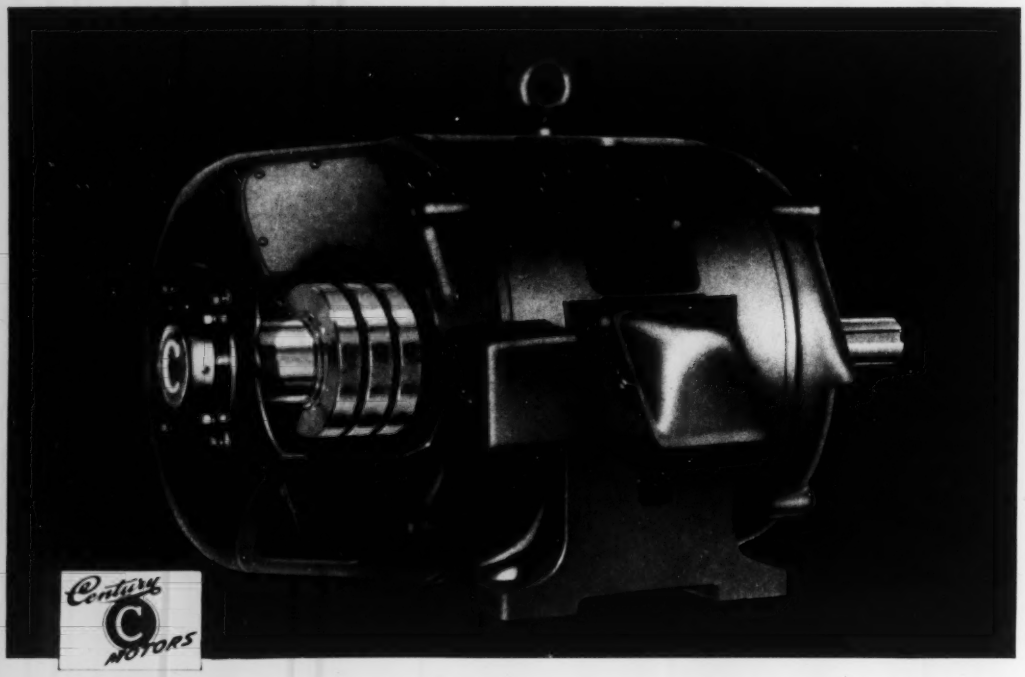

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Bronze collector rings, like these, are important power transmission factors in electric motors—such as those produced by Century Electric Company, St. Louis, Missouri. Making high speed revolutions with the armature, collector rings must be perfect, as sand inclusions, pits, or other flaws cause arcing, with subsequent loss of motor power.

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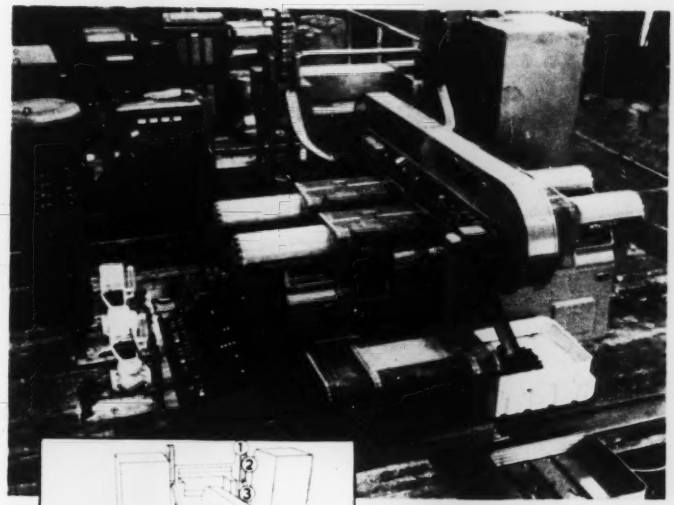
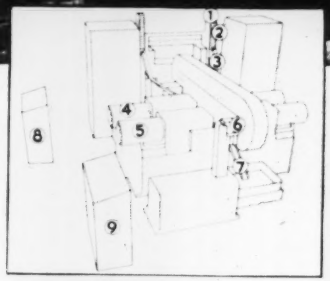




Above is view of Impacter installation for forging jet blades in two steps. At left is key to equipment in picture. 1. Automatic feed, 2. induction heating unit, 3. chute to transfer device, 4. and 5. Impacters, 6. sprue cutoff, 7. discharge chute, 8. control panel for Impacters, 9. panel for complete process

FORGING ON THE FLY

Less energy required to do the job, better grain flow, vibrationless operation and easier automation are all expected advantages of "impacting"

MORE THAN a few tremors are being heard in the metalworking field concerning the new Impacter, a product of the Chambersburg Engineering Co., Chambersburg, Pa. Starting out as an item of much curiosity it's rapidly turning into one of wide interest.

There are only a limited number of the machines in existence. Nevertheless if these can be interpreted as examples of many more to come the machine will find new applications in many fields.

The Machine — Essentially the Impacter is a horizontal drop forge on which both dies are moving dies. The rams which carry the dies—they're called impellers—both move toward each other at a relative speed of about 32 feet per second. Stock is positioned in the impact plane in which the two dies collide. Electronic timing and safety devices prevent misfires and assure a collision in the proper plane.

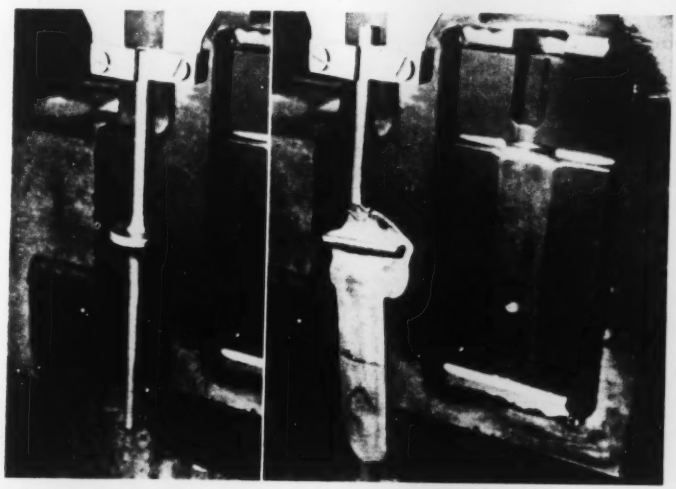
So then the workpiece gets hit from both sides at the same time. Chambersburg claims certain inherent advantages in the double blow. One is an improved grain flow.

Same Job; Less Energy—As they explain it, when only one die is moving and the workpiece is stationary on the nonmoving die, the point of relative zero velocity is the center of the bottom. So all motion must occur around that point.

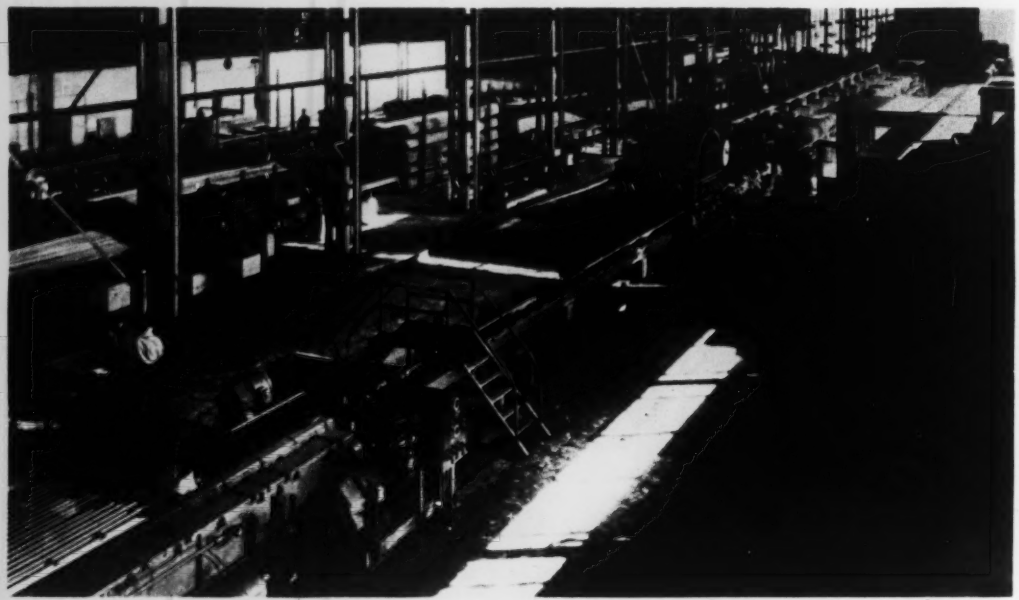
In the case of impacting, where the piece is socked from both sides, the point of relative zero velocity is at the physical center of the piece and disformation takes place around that point. In the case of distorting a sphere into a round disk, impacting takes about 23 per cent less energy since the sum of the distortion distances is smaller. Equation of energy equals mass times distance applies.

Advantages — Impacters can be used singly or in pairs so progressive forging operations can be com-

(*Please turn to* ***Page*** 102)



Left, jet blade suspended on a sprue and held in the impact plane between the opposing dies. Right, the same blade after the first blow is struck



View of continuous buttweld mill looking toward front end. Finishing operations are performed in bcy at left

"Watch Charm" Mill Specializes on Small Diameter Buttweld Pipe

Forming and welding rolls comprising 8-stand mill delivers buttweld to hot saw and cooling bed at rate of 700 fpm in full range of standard and extra heavy sizes

By JOHN D. KNOX
Steel Plant Editor

EVERY few years the steel industry in this country comes up with something that pushes convention into the background such as a bigger hearth blast furnace, an open hearth capable of pouring record heats, or a bloomer which really sends slabs down the runout table. But rarely in these days of production is the field reversed in this respect. Yet that is exactly what has occurred in recent months at Sharon, Pa., where the Sharon Tube Co. has completed a "watch charm" mill which not only is the latest mill to be built in the Shenango Valley but is thought to be the first continuous weld pipe mill ever to have been completed in this country for the explicit purpose of making $\frac{1}{8}$-, $\frac{1}{4}$- and $\frac{3}{8}$-inch buttweld sizes in the full range of standard extra heavy and galvanized grades.

The Sharon Tube Co. was founded in 1929 by the late Henry D. Scott, Wheeling, W. Va., and Meyer Yanowitz, Sharon, Pa., but unfortunately neither founder lived to see their dream mill swing into production.

Producing Now—In May, 1951, Sharon Tube broke ground for an entirely new layout on a 21-acre plot and by July of this year finished pipe was being shipped to consumers. The new plant is located in the industrial district of Sharon, Pa., served by the Erie and New York Central railroads and is adjacent to the Shenango river. The site in former years was occupied by a Carnegie unit of the United States Steel Co. which at one time, singularly enough, had planned to build a tube mill itself on the exact location of Sharon Tube's installation.

At its inception in 1929, Sharon Tube Co. became interested in a British process for manufacturing the three small sizes of buttweld pipe whereby each length of skelp was welded to a short solid steel

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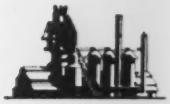

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Hot mill looking from front to rear and showing flashwelder, looping floor, loop controller (indicated by the arrow), and the skelp heating furnace

drawbar and hand charged into a one-door welding furnace. The walls of the pipe under this practice are so thin that a standard buttweld pipe mill literally disintegrates the skelp before it can be drawn from the furnace and welded to size.

Shortcomings—In addition, the British process employed considerable hand labor and the product had a tendency to lack the uniformity in appearance and working qualities so inherent in buttweld pipe produced by the reduction system which many of our modern tube mills employ today. Moreover, it was most desirable that such small pipe should match the appearance and qualities of the larger sizes since it is the practice of the larger integrated pipemakers to manufacture buttweld sizes from $\frac{1}{8}$-inch to 4 inches in their own shops and purchase from outside sources the limited quantities of $\frac{3}{4}$-inch and smaller pipe required to complete their line. Large modern pipe furnaces do not operate efficiently on these watch-charm sizes.

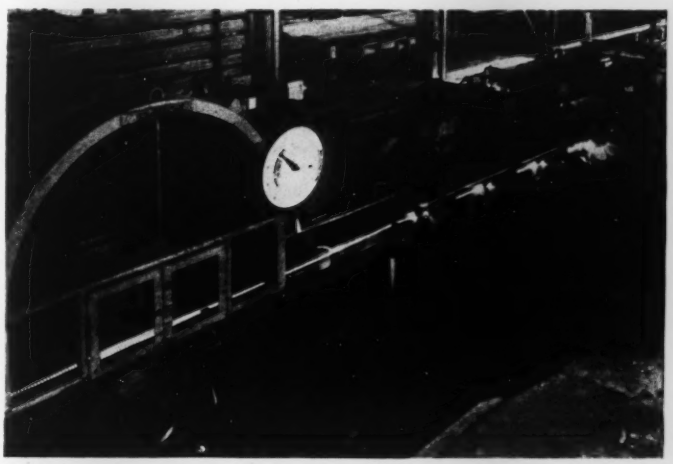
Officials of the Sharon company set about to iron out the many objectionable features of the original process and to develop a mill that would operate on a continuous basis and in an efficient manner. At the outset Aetna Standard Engineering Co., Youngstown, was brought into the picture and in collaboration with the founders of the Sharon company and in later years with A. J. Wagner, formerly superintendent of the Wheeling Steel Corp.'s high-speed Benwood tube works, and now general superintendent of the Sharon Tube Co., a modern high-speed continuous buttweld mill was designed and built.

The original plant of the company continued operation until the production commenced on the new mill, the old employees being gradually transferred to their new posts on a smooth working schedule based on a careful study of the individual aptitudes and service records.

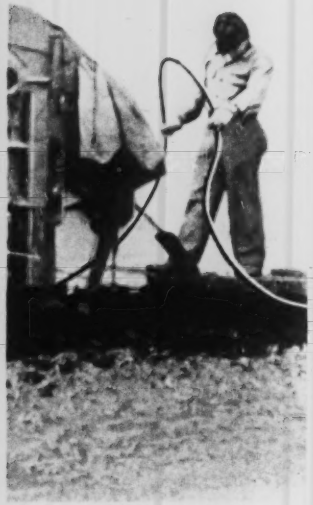
The basic experience and know-how of the veteran personnel quickly developed efficient performance in the new continuous weld technique with quality and quantity production being achieved in the first few hours of operation. Still more interesting was the fact that there was a job in the new mill for every man who had a part in making the operation of the old mill a success.

Moves Along — New mill employed coiled skelp as raw material and was designed to produce 750 fpm of buttweld pipe using the reduction process with which Mr. Wagner has been so prominently identified in the pipemaking industry. Flexing of the tube by this process develops a smooth and superior finish to its surface. Indicated capacity of the plant is from 35,000 to 40,000 tons annually.

Building housing the mill consists of two parallel bays, each 60 x 420 feet, with an extension to the north in which the galvanizing department is located. Skelp is delivered by rail at the southwest end of the mill building, unloaded into storage, charged into the furnace, converted into buttweld pipe, which is tested and bundled. The finished product leaves the southeast end of the mill either by rail or by truck. Thus, from the entrance of the skelp to shipment of the finished product, the flow of material through the various steps of conversion is con-



Skelp being formed and welded into buttweld pipe on an eight-stand mill opposite the workman. The rotary electric hot saw is at left foreground



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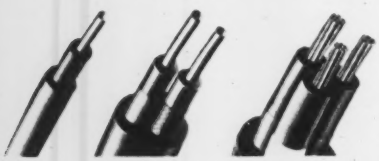

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tinuous and in the shape of the letter U.

Processing — Incoming coiled stock is stored in racks, the storage capacity totaling 2000 tons. Skelp from storage is placed in an uncoiler by a jib crane where it is unwound and fed into a roller leveler for flattening, and thence into a flash welder. Here the tail end of the skelp on its way through the mill is flash welded to the front end of the oncoming coil to maintain continuous operation. Excess metal, which arises as a result of the welding operation, is removed by a trimming machine.

A set of pinch rolls is installed just beyond the trimmer and about 6 feet from the exit end of the welder for the purpose of positioning the tail end of the coil in the flashwelder. Once through these pinch rolls the skelp moves down an inclined runout table, between two sets of magnet rolls spaced 20 feet apart, and thence onto the looping floor where sufficient space is available for loop storage to assure uninterrupted operation of the mill while the uncoiling unit is stopped to permit the coils to be joined in the welder. The magnet rolls assist in feeding the skelp into storage loop.

Reversing its direction the strip is pulled out of loop storage by the No. 2 set of pinch rolls which feed it into a secondary loop before it enters the heating furnace. The speed of this secondary loop is controlled by an electrically-operated mechanism which is tied in with the forming and welding rolls. This device is one of many features woven into the design of the mill and merely illustrates the pipemaking experience and painstaking care of those responsible for the design and improvement of the plant layout.

Slick Control—Here is how the loop control device works. The loop travels on edge from the loop storage through the No. 2 set of vertical pinch rolls and is received by a trough which loops it between two contact rods. These are suspended vertically from a horizontal bar about 5 feet apart and with freedom to swing in any direction. As the speed of the loop slows down, the skelp is brought in contact with one of the rods and instantly the closed electric circuit causes the No. 2 set of pinch rolls to accelerate to conform to the welding roll speed of 650 fpm, (pipe delivery speed 750 feet maximum) thus putting more footage into the loop. The moment the loop begins to acquire too much slack, contact is made with the opposite rod and the speed of the skelp in transit to the heating furnace is slowed down to that of the forming and welding rolls.

General view of the finishing department looking at the start of operations. Coupling screw-on table and final inspection bench are in the foreground

Once through this loop controller the skelp is gripped by a set of horizontal pinch rolls and delivered onto an inclined roller conveyor which moves it through a dummy pass in the furnace threader into the heating furnace. The furnace threader is equipped with a set of slightly preforming rolls and is employed only for feeding the skelp through the furnace when initially starting up the mill.

The welding furnace, 110 feet 6 inches long, is fired with natural gas through 228 burners located on each side of the furnace so that the flame impinges on both edges of the skelp. Three blowers, actuated by 30-hp motors each, aid in bringing the temperature of the skelp up to 2450° F.

Right Temperature — Another feature incorporated into this mill is located at the delivery end of the welding furnace and just ahead of the forming rolls blow nozzles of ¼-inch diameter. The purpose of these nozzles is to blow a jet of air at 11½ psi pressure at the edges of the skelp which are to be welded. The result is two-fold: First, the blast removes any loose scale and foreign matter, and second, it increases the edge temperature of the skelp from 2450 to 2600° F. Thus, the skelp is brought up to its welding temperature at the exact area of weld and at the very instant of welding. In a measure, this intensifying of the heat and localizing it at a specific point is like blowing on the lit end of a cigarette to ignite another.

Skelp with its edges cleansed and at the proper welding temperature now enters eight stands of forming and welding rolls. These rolls are the heart of the continuous buttweld mill. Speed of the mill is controlled manually so that the temperature of the skelp is held as near constant as possible. Skelp leaving the first stand of forming rolls has the contour of a pipe but with a gap between the edges. It then enters the first stand of welding rolls which force the edges together for welding. The skelp initially is welded into a pipe about double the diameter of the finished product. Each successive set of rolls is so turned as to reduce the diameter of the tube by a "sinking" operation and to elongate it by stretching. These flexing operations greatly improve the surface and working qualities of the finished product.

Automatic Cutting — Emerging from the mill at the rate of 700 fpm, the pipe is cut into specified lengths varying from 18 to 22 feet by a new type rotary hot saw developed by Aetna Standard. Once

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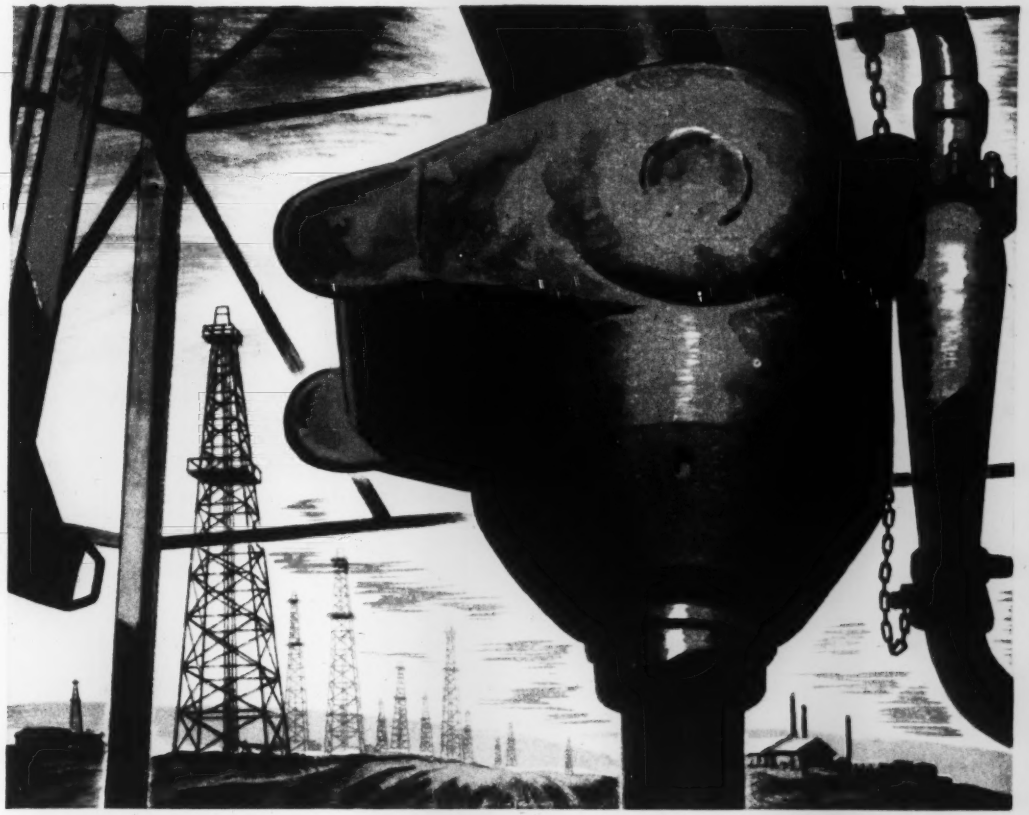
the setting is made for a specified length of pipe no further attention is paid to the operation of the hot saw; it merely darts in and out making the cut without interfering with the forward movement of the pipe being delivered by the forming and welding rolls.

Each length of pipe leaving the hot saw is moved straight ahead for 47 feet by a conveyor made up of numerous individual motors which drive V-type wheels for conveying the pipe into the sizing mill. This 1-stand mill or descaler reduces the outside diameter of the pipe to meet nominal specifications, and effects a reduction of approximately 5 per cent.

No Hands—Once through this mill the sized pipe is brought to rest on a rotary kickoff and immediately thereafter is kicked off at right angles onto a screw-type cooling bed to make room for another oncoming length of pipe. The cooling bed receives 40 lengths of pipe per minute and transfers them into a bundling cradle located in the parallel finishing mill building. When a sizeable bundle accumulates it is transferred by overhead crane from the cradle to storage racks nearby for complete cooling.

From now on, the pipe in transit through the various finishing operations moves toward the front or southwest end of the mill building instead of from the front to the rear as heretofore. After passing through one of two straightening machines, followed by a facing operation which reams and chamfers both ends, each piece of standard weight pipe is subjected to a hydrostatic pressure test of 700 psi, extra strong pipe is tested at 850 psi, and then passes into storage racks in preparation for the threading operation which is accomplished on four high-speed machines equipped with dies to conform to mill schedules. If specifications call for couplings these are screwed on one end while the sections pass in turn down a rail type table.

Finishing Touches—Next in the cycle of operations is inspection. As each pipe moves in turn over the inspection table micrometers and other devices are employed by workmen for locating any defects, and if any are found, the piece is culled out as a reject, the prime stock passing beneath a partition



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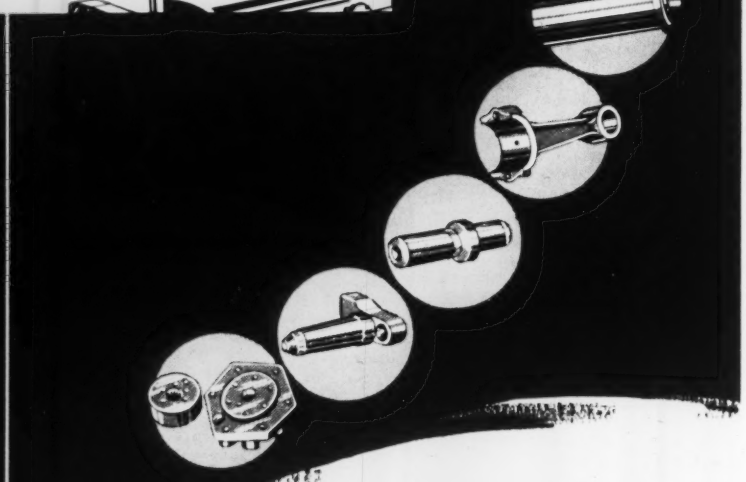

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to the oiling station. Here oil is sprayed on the surface to protect it against rust while in storage awaiting shipment and later in transit to the customer. Following the application of this coating, a specified number of pieces are wired into a bundle and then deposited into a cradle beneath. When 50 of these bundles have accumulated they are strapped into a single bundle, tagged and then removed to storage racks at the extreme end of the finishing mill building. Storage capacity is 2000 tons. So much for black pipe in standard sizes.

Pipe to be galvanized is moved by transfer car from the finishing floor into the galvanizing department which is housed in a separate building, 140 x 60 feet, at the northwest end of the finishing mill building. Here it is dipped into a tank of caustic to remove any oil and then rinsed. Next any mill scale adhering to the inside or outside surface is removed by immersion in sulphuric acid. Then follow two rinses in water to remove any trace of acid, and a dip in a tank of flux. Next a sinker mechanism immerses the pipe in a bath of molten zinc; it emerges with a galvanized coating inside and outside, passes in and out of a bosh of water for cooling and thence over skids into a bundling cradle. It is then returned to the finishing building for further processing, stocking or shipment.

Truly, a "watch-charm" mill but one that sends tonnage scooting to the bundling tables.

Compressor Facts Cataloged

Basic application information, design specifications, and dimensions of multistage and multicylinder compressor units are included in the 44-page booklet published by Cooper-Bessemer Corp., Mt. Vernon, O.

NPA Holds Diamond Session

Proper use of diamond grinding wheels and tools and efficient salvage methods will conserve industrial diamonds as vitally critical defense and civilian production material. These were the subjects under consideration Nov. 14 at a National Production Authority clinic meeting held in Cleveland.

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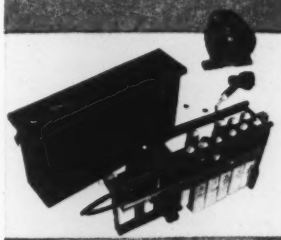

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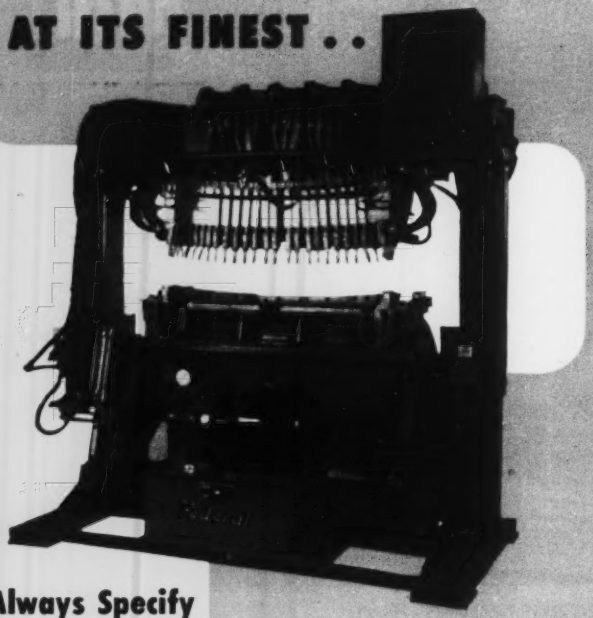

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Forging on the Fly

(*Concluded from Page 89*)

pleted. Automatic conveyor system passes the blanks through an induction or gas heating unit, then into the impact plane and, when a second unit is used, on into the second impact plane. Conveyor can be hopper fed. Finished parts and scrap come out the other end separated.

Due to almost complete absorption of energy in the forging and the impellers any shock or vibration is imperceptible — a nickel standing on edge will balance through the complete cycle. As a result the Impacter can be located on the upper floors of a plant and can be in close proximity to delicate and sensitive equipment without disturbing it.

Where Are They?—Machines are already operating in several customer plants. International Silver Co., Meriden, Conn., has the machine in their plant. It's a single unit and it's cold working stainless steel knife handles at the rate of 3000 per hour, twice the former output. Packard Motor Car Co. will use several of the installations for hot working jet engine blades. Blade will come off the Packard machines complete except for cold coining and polishing. Packard already has several jobs lined up for peace time production on the machines.

Thompson Products is cold coining jet blades on an Impacter. Oldsmobile will use one for rough forging jet blades.

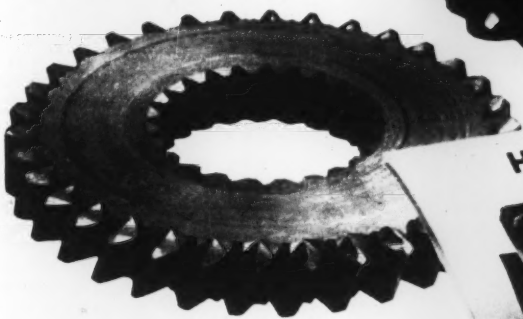
Machine sizes are designated by numbers. Number 4 is capable of a 4000 foot pound punch. Number 6 delivers 6000 foot pounds, etc. The machines built so far are of the number 4 and 6 variety. Packard has ordered a number 15, and the Chambersburg people have engineered a number 400.

New Plastics Group Formed

Because of the increase in the use of plastic monofilaments, extruders of the material have formed a new division of Society of the Plastics Industry Inc.

Thermosetting molders of big plastic products have formed their own committee, and this new group will represent extruders of saran for plastic woven products.

RUST PREVENTIVES needn't be "GOOEY" to be GOOD!



HOUGHTON RUST PREVENTIVES

HOUGHTON "COSMOLINE"
to meet Government Specifications

Cosmoline 2-82C (Type P-4)
Cosmoline 2-121 (Type P-5)
Cosmoline 2-84B (Type P-6)
Cosmoline 333 (Type P-12 AN-C-124A)
Cosmoline 377 (Type P-3 AXS-1759 Gr. 2)
Cosmoline 332 (Type P-7 USA-2-122)
Cosmoline 335 (MIL-L-3150)
Cosmoline 946 and 947 (Type P-10 USA-2-126)
Cosmoline 911 (MIL-C-6708 Type 1)
Cosmoline 344 (Type P-1 AXS-673)
Cosmoline 1120-1123 (AN-VV-C-576B)
Cosmoline 910 (JAN-P-115 Wax)
Cosmoline 1044 (Type P-9 MIL-L-644A)

HOUGHTON "RUST VETO"
to meet general industry needs

Rust Veto 344—Solvent, Polar Type
Rust Veto 110-D—Varnish Type
Rust Veto A-2—Dry Film, Waxy Type
Rust Veto 377—Solvent, Oil Type
Rust Veto 266—Fingerprint Neutralizer
Rust Veto Light, Medium, Medium Heavy, Heavy, and Extra Heavy—Inhibited Oil Types
Rust Veto Concentrate—for dilution by user

Times have changed for rust preventives, too! Today, Houghton's thin-film coatings are replacing many grease-type compounds for long- or short-term protection . . . indoors or out!

Back in the 1870's when Houghton "Cosmoline" became the byword for rust prevention, its molasses-thick protection helped to earn it lasting fame. But Houghton developments since then have resulted in new thin-film "Cosmolines" that also meet the most rigid "specs" for rust prevention.

One secret of surety of protection with new types of preventives is "polarized adherence" to metals. They cling to parts until they're removed.

Whether your operations call for a solvent type, dry or waxy film, oil or grease coating, you can specify a Houghton "Cosmoline" or "Rust Veto" for guaranteed results. Our latest Rust Preventive Bulletin contains a handy chart describing their various applications throughout industry. Ask the Houghton Man for a copy or write to E. F. Houghton & Co., Philadelphia 33, Pa.

COSMOLINE and RUST VETO
. . . products of

E. F. HOUGHTON & CO.
PHILADELPHIA · CHICAGO · DETROIT · SAN FRANCISCO

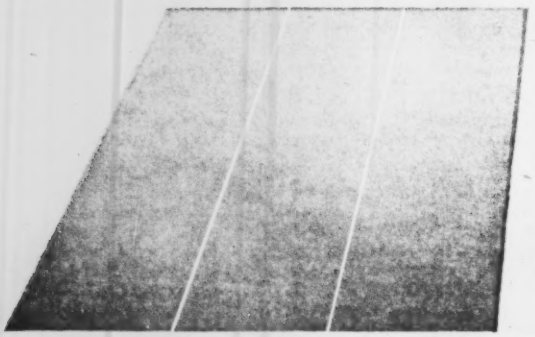
Ready to give you on-the-job service . . .

FOLLANSBEE
COLD ROLLED STRIP
PRECISION ROLLED TO YOUR SPECIFICATIONS

Follansbee offers the special attention and services which only the flexibility of a compact organization can provide. If you need Cold Rolled Strip Steel, Follansbee merits your consideration as a source for your supplies.

Follansbee brings to the rolling of this staple product its many years of experience as a maker of high quality steel specialties. This means that you can rely on Follansbee to furnish you with Strip that meets your most exacting requirements in Temper, Gauge, and Width.

On your next order for Cold Rolled Strip—or other steels—it will pay you to check with Follansbee.



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GENERAL OFFICES, PITTSBURGH 30, PA.

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COLD ROLLED STRIP

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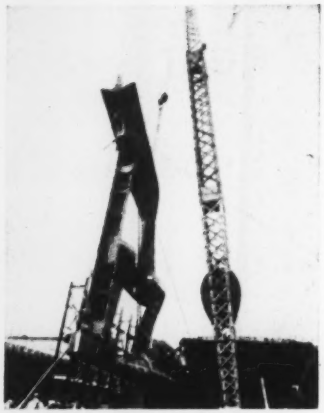
Mills: Follansbee, W. Va.

FOLLANSBEE METAL WAREHOUSES
Pittsburgh, Pa. Rochester, N.Y. Fairfield, Conn.



48-Ton Support

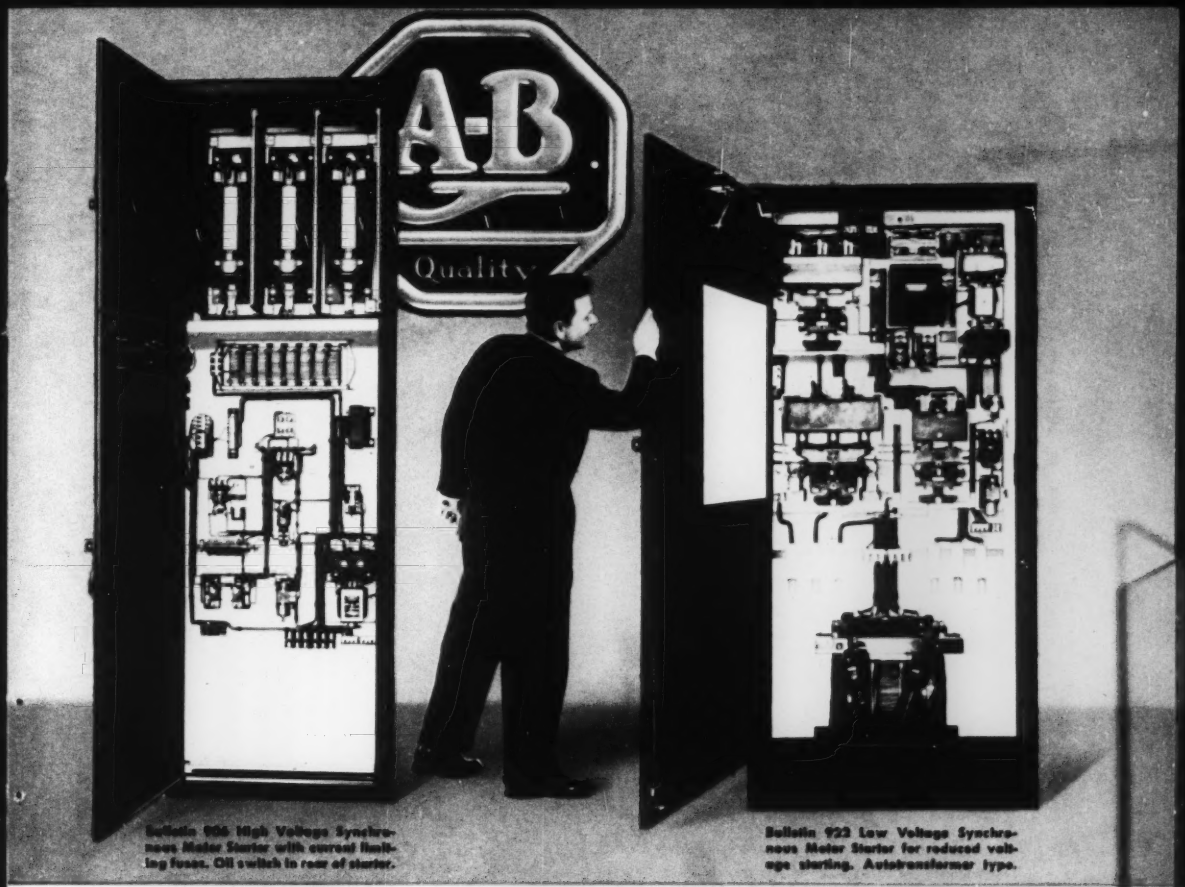
This 48-ton casting assembly serves as the rugged framework that supports shaft, propeller and rudder of a new 647-foot ore carrier. The casting is 28 feet high, measures 25 feet from front to back. Structural unit was cast in five sections by Penn Steel Castings Co., Chester, Pa., and was subsequently joined by a welding job

Less Diamond Need Predicted

American dependence upon industrial diamonds for machine toolwork may be greatly lessened through development of electrical methods for machining and grinding of cemented carbides. So says K. R. Beardslee, a member of the diamond conservation committee of NPA, and general manager of Carboloy Dept., General Electric Co., Detroit.

At present, according to Mr. Beardslee, restrictions on the use of industrial diamonds have been placed on manufacturers by the Department of Commerce. Several new methods for grinding carbide tools have been advanced to the testing stage, and, though not eliminating the use of diamonds, will greatly lessen the demand for industrial diamonds.

All of these new carbide machining and grinding methods utilize electric power in one method or another to cut the carbides. If the new methods prove successful, he concluded, industry will be in a much better position to carry on production of defense products without being so dependent upon present South African diamond sources.



Bulletin 906 High Voltage Synchronous Motor Starter with current limiting fuses. Oil switch in rear of starter.

Bulletin 922 Low Voltage Synchronous Motor Starter for reduced voltage starting. Autotransformer type.

STARTERS FOR BIG MOTORS

Bulletin Number	Type of Motor	Operation	Maximum Horsepower 208-220v	440-550v	2000-2500v	2501-4600v
646	Sq. Cage	Manual	125	250	—	—
726	" "	Automatic	—	—	700	700
740	" "	"	300	600	—	—
741	" "	"	300	600	—	—
742	" "	"	300	600	—	—
746	" "	"	300	600	—	—
747	" "	"	—	—	700	700
904	Synchr.	Manual	125	250	—	—
906	"	Automatic	350*	700*	900*	900
914	"	"	250*	250*	—	—
922	"	"	350*	700*	900*	900

(*) At 100% power factor

● The motor starters, shown above, are examples of the many big units in the Allen-Bradley line.

Various types of manual or automatic starters for synchronous motors are available . . . up to 900 hp., 220 to 4600 volts.

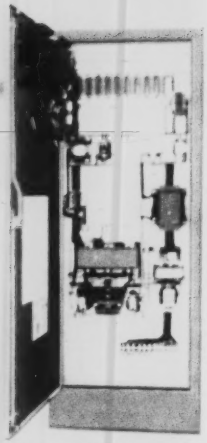
High voltage squirrel cage automatic motor starters are listed up to 700 hp., 2000 to 4600 volts. Relays and contactors are time-tested A-B designs, fully protected when specified, by current limiting fuses.

The A-B Handy Catalog is a convenient manual on motor controls . . . large or small. Write for it, today!

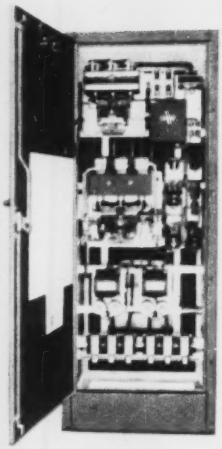
Allen-Bradley Co., 1316 S. Second St.,
Milwaukee 4, Wis.

8-52—MR

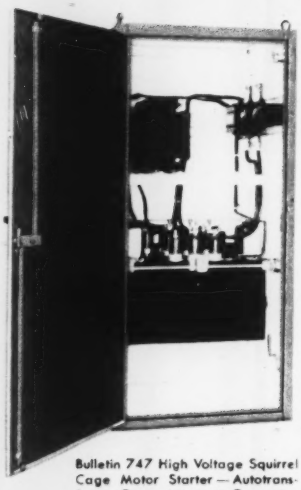
A-B
QUALITY
MOTOR CONTROL



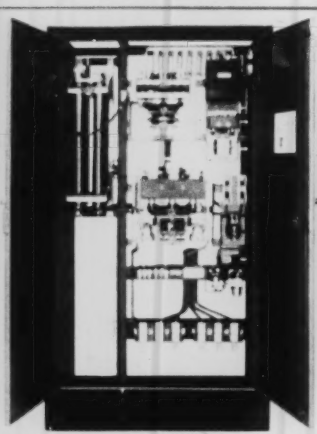
Bulletin 906 Low Voltage Synchronous Motor Starter—Full Voltage Type—Automatic Operation



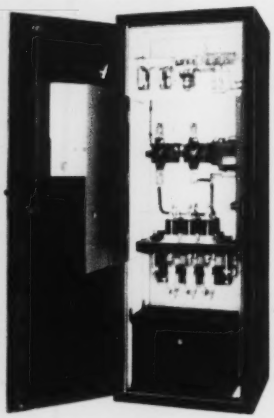
Bulletin 742 Low Voltage Squirrel Cage Motor Starter—Stepless Resistance Type—Automatic



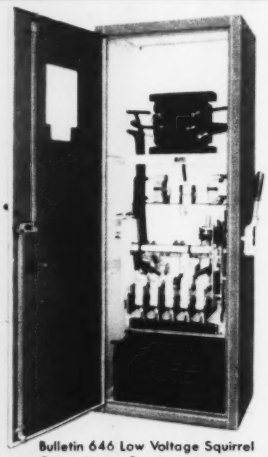
Bulletin 747 High Voltage Squirrel Cage Motor Starter—Autotransformer Type—Automatic Operation



Bulletin 914 Low Voltage Synchronous Motor Starter—Resistance Type—Automatic Operation



Bulletin 726 High Voltage Squirrel Cage Motor Starter—Full Voltage Type—Automatic Operation



Bulletin 646 Low Voltage Squirrel Cage Motor Starter—Autotransformer Type—Manual Operation

Starters for Large High and Low Voltage Motors

The high quality of design and construction, which has made the Allen-Bradley line a leader among motor starters, is built into Allen-Bradley starters for big motors, too.

These big starters can be supplied with all standard accessories, such as contactors for controlling auxiliary equipment, meters and instruments, current limiting fuses, etc. At maximum rating, these starters have an interrupting capacity of 10 times motor full load current.

Standard features of A-B synchronous starters include polarized field frequency relay, automatic resynchronization, thermal overload relays, out-of-step relay, and undervoltage protection. Reduced voltage starting is available either with resistor or autotransformer control.

Standard features of the big A-B squirrel cage motor starters include overload relays. Current limiting fuses are recommended for all high voltage starters.

ALLEN-BRADLEY
QUALITY
MOTOR CONTROL

A-B Quality

Allen-Bradley Company
1316 S. Second Street
Milwaukee 4, Wis.

B-22—602

Stud Welded Hanger

Use of stud welding to hang, hold and handle materials in process is illustrated in this application. An eye bolt is employed as a means of supporting hot water tanks in a vertical position through wash, pickling and galvanizing tanks. Installation is made by Nelson Stud Welding Division, of Morton Gregory Corp., Lorain, O.

More Industries Try TV

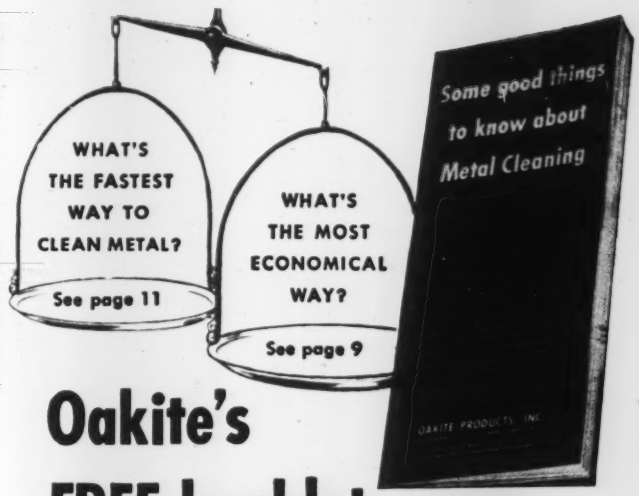
INDUSTRIAL television is finding more applications every day, reports the head of one of the largest industrial TV firms. Chief advantage: Workers can see where they can't look.

In a busy steel mill, for instance, an operator controls the conveyors carrying steel tubes through two annealing furnaces. His job is to keep tubes piled three or four high in the furnace, but the hitch is that the furnaces are 100 feet away and facing another direction.

Private Network — A television camera looks into each furnace for the operator and reports what it sees on a screen in front of him. By flipping a selector switch, he can look inside either furnace on what amounts to his own network hookup.

A Chicago power generating plant keeps tabs on the smoke condition of its four smoke stacks by TV. They've even gone so far as to put windsield wipers on the camera lenses so the picture is good even on rainy days.

Electronic Clerk — Railroads are using television for checking freight car numbers from within the yard clerk's office. An engi-


WHAT'S THE FASTEST WAY TO CLEAN METAL?
See page 11
WHAT'S THE MOST ECONOMICAL WAY?
See page 9
Some good things to know about Metal Cleaning
OAKITE PRODUCTS, INC.

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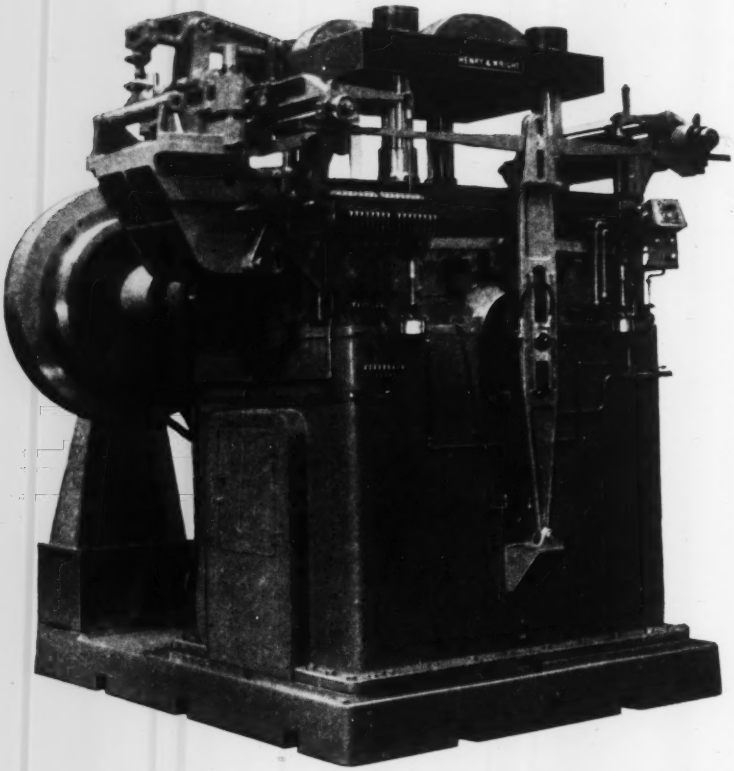
New 350-Ton Henry & Wright



Right and left hand sections of housing for automotive window control gears. Replaced zinc castings. Produced from .065" thick hot rolled steel in coil form at rate of 60 completed parts per minute. Steps performed with each stroke of machine: notch, pierce for pilots, draw, redraw, strike and taper, lance for partial blank outline and pierce holes for shaft, bend ears at 90°, pierce and bend ears at 45°, close ears and form weld-ing tabs, lance for partial outline, bend ears 90°, final forming, cut off one complete right hand and one left hand housing section.

OTHER EMHART PRODUCTS INCLUDE:

PREMIUM QUALITY STAMPING PRESSES

THE V & O PRESS CO.
Division of Emhart Mfg. Co.
HUDSON, NEW YORK

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Division of Emhart Mfg. Co.
HARTFORD 2, CONNECTICUT

AUTOMATIC PACKAGING EQUIPMENT

STANDARD-KNAPP
Division of Emhart Mfg. Co.
PORTLAND, CONNECTICUT

PLASTIC BOTTLES, RODS, TUBES, SPECIAL SHAPES

PLAX CORPORATION
Subsidiary of Emhart Mfg. Co.
HARTFORD 1, CONNECTICUT

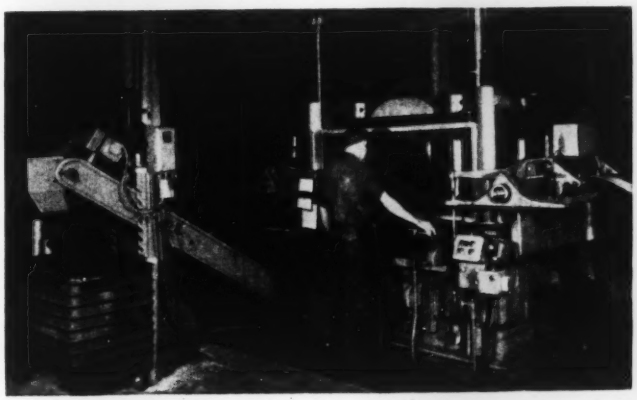
Dieing Machine *permits redesign of die-cast parts for more economical production via progressive stamping*

This newest addition to the Henry & Wright line of Dieing Machines broadens significantly the range of parts which can be produced complete-per-stroke with multiple-station progressive dies. It will produce completed drawn and formed stampings from medium and heavy-gauge sheet stock.

Up to 16" strokes can be provided for producing straight shells up to 3⅞" long and tapered or hemispherical shells of substantially greater lengths.

The lower crosshead is guided on exceptionally long ways, rigidly keyed in the lower base to provide precision alignment of tools throughout the stroke, even under severely eccentric loading.

Maximum tool protection is designed and built into the 350-ton Dieing Machine, which will handle material up to 25" wide and 11/32" thick. The same great features of other Dieing Machines are present, on enlarged scale, in this 350-ton beauty.



SAVINGS IN MANPOWER and production operations are manifest in this installation of the 350-ton Dieing Machine. One man attends the press, which automatically stamps complete parts out of sheet metal. Compare the economies of producing pieces complete-per-stroke at high speed via the Dieing Machine with the previous method of using zinc die castings

Only the best is good enough

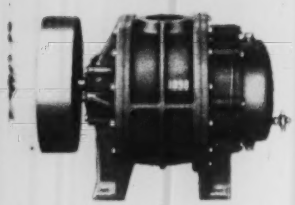
FACT PACKED CATALOG

Complete descriptions of all Henry & Wright Dieing Machines. Write: Henry & Wright, 441 Windsor St., Hartford 5, Connecticut.

HENRY & WRIGHT
Division of Emhart Mfg. Co.

For 10 CFM or 100,000 CFM ...compare blower values

ROTARY



Typical low-capacity R-C Rotary Positive Blower. Sizes range from 5 cfm to 50,000 cfm, permitting selection closely matched to needs.

- Choice of Rotary or Centrifugal
- Capacity matched to the job
- Easy accessibility
- Ruggedness
- Ease of installation
- Ability to handle overloads
- Long-time durability
- Freedom from breakdowns
- Low maintenance costs
- Engineering assistance
- Proved reputation of maker
- Customer satisfaction

No need to take chances when buying blowers, exhausters or gas pumps. Just put this "detector-test" to work on your specific problem and you'll arrive at the most satisfactory answer.

For instance, if you're debating between Rotary Positives and Centrifugals, remember that only Roots-Connersville builds both—the exclusive *dual-ability line* that permits unbiased recommendations. Their wide range of capacities supplies sizes and types that are quite likely to be most closely matched to your needs.

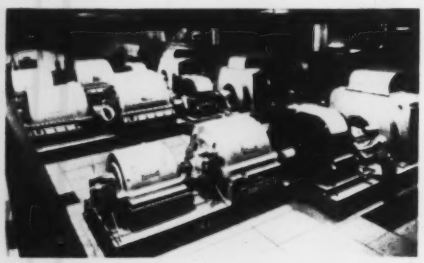
For economy of operation, reliability and low maintenance, we refer you to a list of users that dates back almost a century. If you'll rate your possible choices on a performance basis, you'll usually find R-C equipment "tops" on the list.

To help you make the most profitable, practical decision, our experience is at your service.

ROOTS-CONNERSVILLE BLOWER DIVISION
1252 Shelton Ave., Connersville, Indiana

CENTRIFUGAL

Six R-C Multi-Stage Centrifugal Blowers equipped with automatic regulators to provide extremely wide range of operation at various pressures and capacities.



ROOTS-CONNERSVILLE BLOWER

A DIVISION OF DRESSER INDUSTRIES, INC.

BLOWER BUILDERS SINCE 1854

neering firm has a TV camera in a rocket firing pit. Radioactive materials are handled from a safe distance with the aid of TV.

Faster Handling Pays Off

Drop bottom boxes and fork lift system up stamping output, speed truck loading

TRUCKS ARE LOADED in 20 minutes instead of 1 hour and 30 minutes. That's the gain Columbia Metal Stamping Co., Cleveland, credits to its system of mechanized, palletized materials handling adopted in 1951.

Installation of drop-bottom box equipment in the manufacturing process also effected a 15 per cent increase in plant production, says

BOTTOM DROPS OUT
. . . cuts materials handling time

Ambrose E. Koch, Columbia president. The automotive stamping company uses 36 punch presses ranging from 15 to 350 tons. About 35,000 of the plant's 53,000 sq ft is devoted to manufacturing operations, the remainder to shipping and storage.

Barrels Out—Before introducing drop-bottom boxes, the firm used barrels for moving stampings from one operation to another, or from one section of the plant to another. About 600 of these barrels have been replaced by 300 boxes and more of the latter are being added.

The 30 x 30 x 24-inch boxes are used for all stamping sizes. They rest in steel frames beside the presses, where they serve for both

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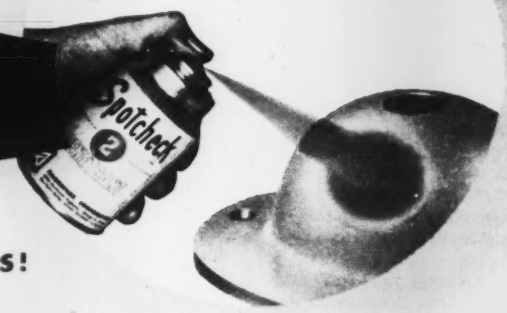
THE PIONEER IN NON DESTRUCTIVE TESTING

Now Announces → Spotcheck

a simple
SPRAY-ON
DYE PENETRANT
inspection



END GUESSWORK ARGUMENTS!

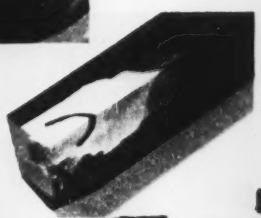
Use it to Locate and Mark Defects Open to the Surface in Metals—Carbides—Plastics —Ceramics—Practically any Non-Porous Solid

Spotcheck is a new, *lowest cost* inspection tool for use where remote location, small surface areas, limited volume or the cost of disassembling equipment makes use of fixed inspection equipment impractical. The complete kit is as easy to carry as a dinner pail!

A new member of the world's best known Magnaflux family of inspection methods, Spotcheck finds and indicates cracks, porosity, laps, seams, etc., clearly and unmistakably. It takes the guesswork out of countless sampling inspection jobs.

Used for *maintenance inspection*, local and routine Spotcheck tests will help you to prevent costly on-the-job failure of production machines. SPOTCHECK IS IDEAL FOR INSPECTION OF CARBIDE TOOLS AND OTHER TOOL CRIB USE!

Spotcheck crack indication revealed in inspection of local area of punch press frame.



How Spotcheck shows up non-visible crack in carbide tool. Correct grinding! Avoid failure after set-up!

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Complete
Spotcheck Kit No. S
8 12-oz. cans; 4 of Clean
2 each of Penetrant and D
veloper, together with carry
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feeding and receiving materials. Boxes weight empty is 231 pounds when filled with stampings, loads can be as heavy as 2000 pounds.

Containers are shifted from process to process by two driver led Transtacker electric fork trucks. Plant officials report the combination of drop-bottom boxes and trucks eliminates the need for hand trucks, toggle grabs and hoists formerly used in barrel handling. According to A. J. D'Veleskis, plant manager, the considerable time and motion saved frees three men for more productive work elsewhere.

Expendable Pallets — Materials are moved by truck from manufacturing areas to storage or washing machine, where they are processed for shipment. In Columbia's storage area, boxes are tiered four high.

After stampings are washed and protective coated, they are in most cases fed directly into expendable pallet boxes for shipping. These boxes are moved to the dock by another Automatic Transportation Co. lift model, the Transporter, and loaded into waiting highway trucks.

Seventy-five per cent of Columbia's shipping is done in expendable pallet boxes. Plans call for 100 per cent palletization for shipping purposes as soon as possible, says Mr. D'Veleskis.

Look to the Sun

SCIENTISTS and engineers in the future will look to the sun and the seas for energy and material sources. So said Charles L. McCuen, General Motors vice president, when he addressed the Rutgers occupational vision conference at Atlantic City.

Mr. McCuen, who heads the GM research laboratories, declared the sun would provide for every conceivable use of power, if a reasonably efficient means can be found to convert or utilize its energy.

"We have made only feeble attempts at utilizing this tremendous source of free fuel," he said. "Someday some man or group of men of clear vision will discover the process which nature has been demonstrating to us with every plant that ever grew."

Energy per Acre—He explained that in the United States "we receive an average yearly amount of energy per acre equivalent to 800 tons of coal, or about 2¼ tons each day, from sunlight". Meanwhile, Mr. McCuen pointed out, the time is anticipated when nuclear energy will become commercial. "We feel," he said, "that this form of power will take its place alongside the coal-burning steam plant and the hydroelectric plant."

He added that even this form of power requires fuel, uranium, which is limited in supply.

Army Studies Atom Power Need

Possibilities for using energy from nuclear reactors to fill certain Army requirements for electric power will be studied by the Corps of Engineers, it was announced recently. Purpose of the program of study will be to determine for the Army the exact nature of requirements that might

WE MAKE THE STEEL -
All of our steel is made in our Heroult Basic Electric Steel Furnaces. We use only electric steel because it is cleaner and subject to closer control. This means your forgings are of the best quality obtainable.
NATIONAL FORGE & ORDNANCE COMPANY
IRVINE, WARREN COUNTY, PENNA.

be filled by electric power produced from atomic sources. An attendant result should be selection of the nature of reactor designs most suitable for that purpose.

Lubricant Ups Packing Life

Packing life in reciprocating pumps handling low-temperature hydrocarbon liquids is said to have increased more than 15-fold when a large chemical company changed over from petroleum to synthetic Ucon lubricants. Manufactured by Carbide & Carbon Chemicals Co., division of Union Carbide & Carbon Corp., the synthetics prevent adhesion of ice crystals to push rods, thereby preventing torn packing in the pumps.

Conveyor Manual Lists Parts

"Conveyor Terms and Definitions," a manual on standard nomenclature for conveyor types and parts, has been published by Conveyor Equipment Manufacturers Association.

The manual contains about 1500 listings and line drawings of more than 80 types of conveyors and parts. It is a product of more than three years work by the association's technical committee, which is composed of engineers from all branches of the conveyor industry. The 64-page manual is available through association members or their Washington office.

Meter Parts Blast Cleaned

RUST and corrosion is effectively removed from reconditioned water meter parts by airless blast cleaning in an American Wheelabrator Tumblast, an eastern reconditioning firm reports.

Loads of 20 of the ⅝-inch size meters are cleaned in approximately 15 minutes, and as many as 320 have been cleaned in an 8-hour day. The machine will accommodate loads of larger size meters also.

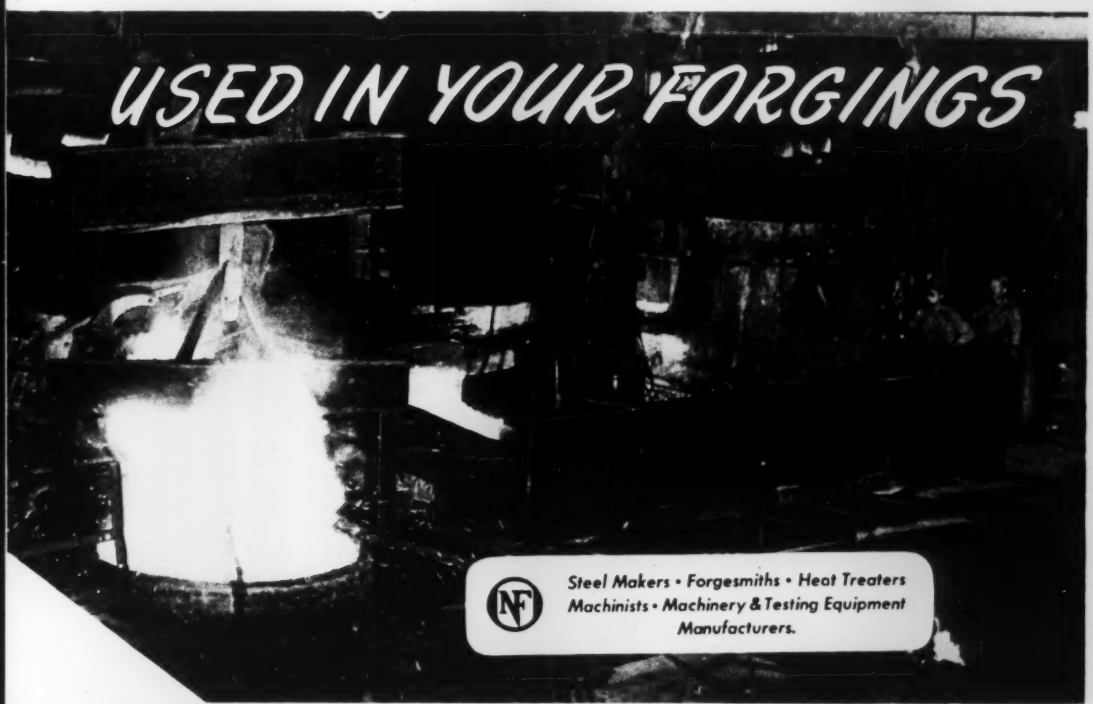
Up and Over—Unit has a continuous rubber apron-type conveyor belt that forms the blast chamber. The belt conveyor continually draws pieces up from the bottom of the barrel load and cascades them over the top of the load, where they are subject to the cleaning action of metallic abrasive thrown centrifugally by a rotating bladed wheel in the roof of the cabinet. In this way, all areas of the work receive the same amount of cleaning action.

The abrasive, after striking the work, drops into a hopper and passes through a recycling system which removes the contaminants from it. The cleaned abrasive is fed to the hurling wheel for reuse.

Header Testing Refined

An electro micromagnet for testing aircraft exhaust system headers and manifolds is a development reported by Pan American World Airways' Pacific-Alaska Division, San Francisco. Previously, inspection to detect weak areas and brittle spots was done by the relatively unrefined method of tapping exhaust system piping with a ball pean hammer and relying on a well-tuned ear to pick out bugs.

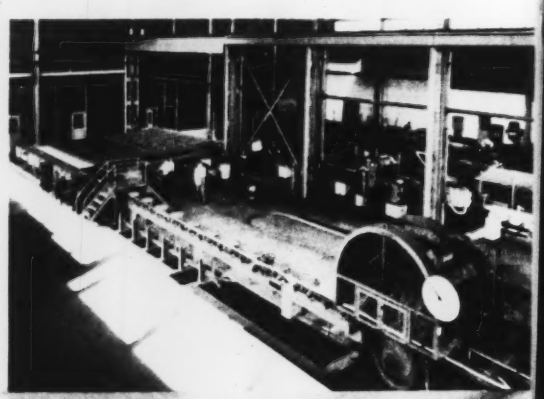
The Pan Am engine inspector who worked out the device will

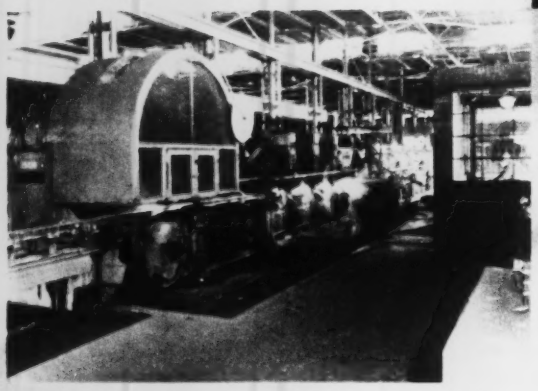


NEWEST

continuous butt weld

DESIGNED, BUILT AND INSTALLED BY AETNA-STANDARD FOR SHARON TUBE





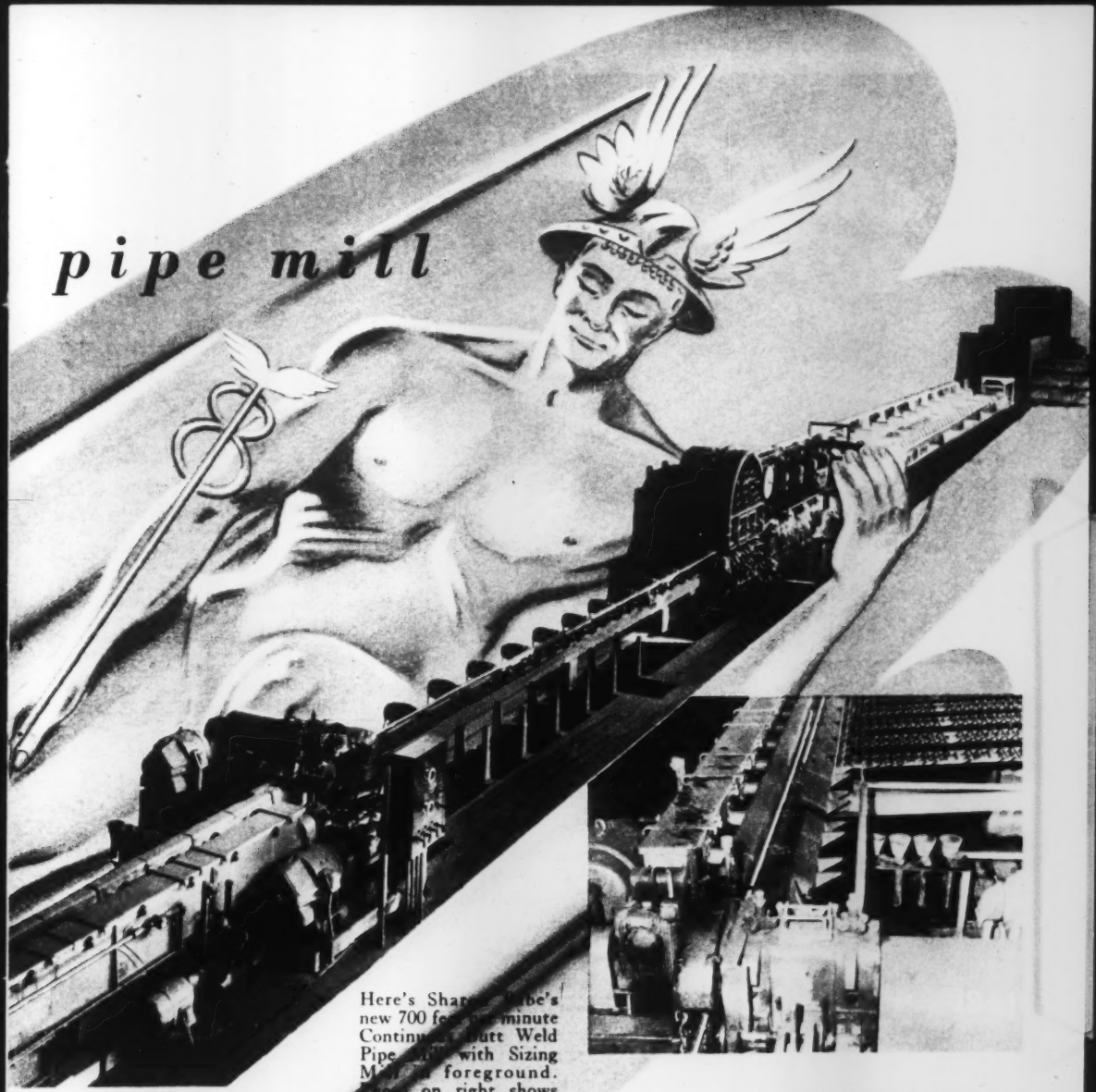
The Rotary Hot Saw (lower right) cuts pipe into specified lengths between 18 and 22 feet. Lengths then pass through sizing mill to Screw Type Cooling Bed (upper left).

Looking toward the furnace end with Rotary Hot Saw in foreground and 8-Stand Forming and Welding Mill. Control house on right.

- Rated at 700 feet per minute.
- Size range — $\frac{1}{8}$" to $\frac{3}{4}$".
- Actual production run — 191,225 feet (40 miles) of $\frac{1}{4}$" pipe in five hours.
- Rotary Flying Hot Saw cuts to pre-determined lengths between 18 and 22 feet.
- Sizing Mill in direct line with Forming and Welding Mill.
- New Type Rotary Kick-Off handles 75 lengths of pipe per minute.
- Screw Type Cooling Bed aids in straightening pipe.
- In addition to mill, Aetna-Standard's responsibility included the designing and building of the entire plant from ground up.

Designers and Builders of Pipe and Tube Mills...

pipe mill



Here's Shar[illegible]be's new 700 fe[illegible]minute Continu[illegible]utt Weld Pipe [illegible]with Sizing M[illegible] foreground. [illegible] on right shows [illegible] type rotary kick-off which can handle 75 lengths per minute.

Aetna-Standard

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M. Castellvi, Inc., New York, N. Y.—Mexico, Central and South America.

Societe de Constructions de Montbard, Paris, France—France, Belgium, Holland, Luxembourg, Switzerland.

Demag Aktiengesellschaft, Duisburg, Germany—Germany, Austria, Yugoslavia, Greece, Turkey, Egypt.

Compagnia Italiana Forme Acciaio, Milano, Italy—Italy.

Aetna-Japan Company, Ltd., Tokyo, Japan—Japan.

Hale & Kullgren, Inc., Akron, Ohio—Representative for the Rubber Industry.

Designers and Builders to the Ferrous, Non-Ferrous, Leather and Rubber Industries

This T-J Cutter at work on a connecting rod die block for a board drop hammer. A cutter of right design and heat treatment for this high speed work in tough die steels, making possible maximum efficiency of these machines.

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In die and forge shops everywhere . . . T-J Die Sinking Milling Cutters are today's top favorites . . . because they're "tops" in performance!

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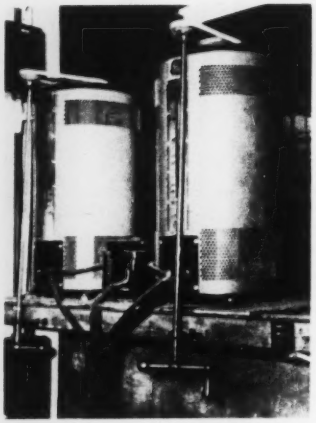

Mounting Space-Saver

Unique mounting arrangement for six welders saves space and keeps equipment clean at Huber Mfg. Co., Marion, O. Mounted at a height of 8 feet, the General Electric welders are controlled by a pulley and shaft mechanism that enables the workers to make current adjustment easily from the floor

collect royalties from American Instrument Co., which will produce the instrument.

An extremely sensitive and stable bridge, the device measures inductance of a coil whose core is the structure being tested. Inductance of the coil is proportional to the permeability of the core material, therefore a measure of the heat corrosion of the tested structure.

Oxides Removed Without Acid

A procedure that eliminates use of strong acids in removal of cuprous and cupric oxides from the surface of copper and copper alloys that have been subject to high temperatures is a development of Enthone Inc., New Haven, Conn.

By using patented Ebonol "C", cuprous oxide is converted to cupric oxide, which is easily removed by means of dilute acids or by sodium cyanide. If the oxide is heavy, the cycle is repeated several times until the clean bare copper alloy surface is exposed.

Formerly, the cuprous oxide was removed by using strong oxidizing acid mixtures which undermined the base copper to free the oxide. The acids used in this process at-

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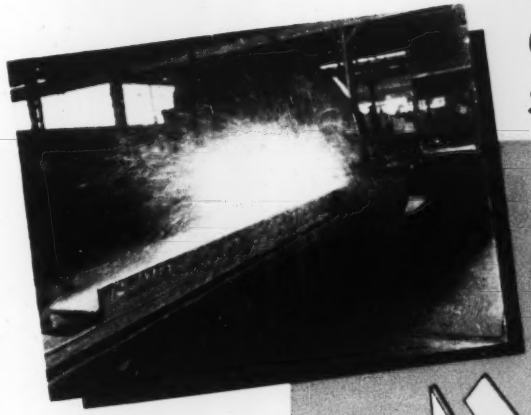
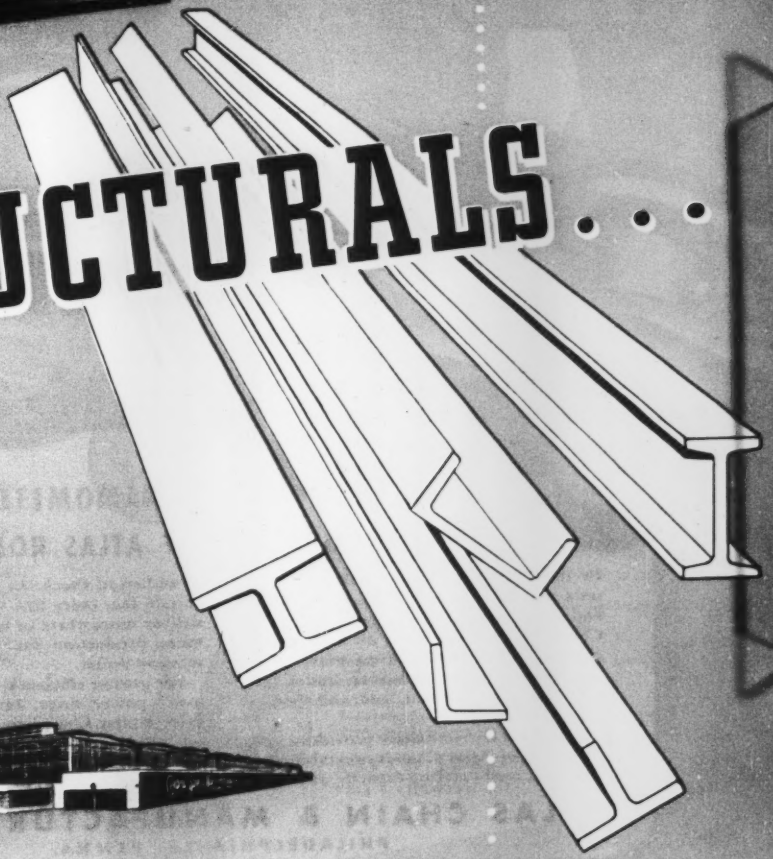
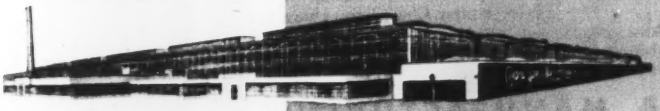


STRUCTURALS . . .





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ATLAS

ATLAS ROLLER CHAIN

tack the copper, leaving a deeply etched surface that mars the finish.

The new process is suitable for pure copper, tin-bronzes, phosphor-bronzes, brasses, and various copper alloys containing silicon and aluminum.

Card-Recording Timesaver

Research firm employs a simple card check system to collect data and chart progress

RECORD CONTROL system for following progress of routine analytical work on large numbers of samples proves a timesaver for the chemical engineering department of Sam Tour & Co. Inc., New York.

The system developed by the consulting and research engineering firm offers two important advantages in simplifying laboratory operation. According to the company, it enables supervisory personnel to know at a glance progress of work involving a series of analytical steps. In addition, it saves the chemist who actually does the work considerable nonproductive clerical time.

Simplified, Standardized—Effect is to provide a simplified, standardized form, complete with precalculated constants, on which to record and calculate results.

The records system is based on a set of 4 x 6-inch cards. Each set has a master card that contains data about the origin of the sample, series of analyses required and finally, results of each analysis as it is reported. Each remaining card in the set corresponds to an individual analysis and these are distributed to personnel who perform the analysis.

These analysis-data cards identify the sample and give expected range of results. For certain analyses, weight of sample needed to insure accuracy within expected range is already stamped on the card.

Precalculated Constant — Cards are printed so that all data needed for subsequent work are written in a space where they are used directly in the calculation. These include weight of sample, weight of precipitate, or volume and normality of titrant, etc.

Another timesaving feature provides that whenever possible all numerical factors required to convert analytical data to the form desired are precalculated as a single constant and printed in the appropriate place. In this way, results can be obtained quickly with a few slide rule operations.

As each analysis phase is completed, results are card recorded, with date of completion. Cards from completed phases are attached to the master file copy and information summarized on the master. Thus, supervisors can get a complete run-down of any project's status by a quick reference to one file.

Navy Saves on Work Measuring

A work measurement system that scientifically determines the number of workers required to accomplish given work schedules is saving millions of dollars for the Navy Department. Bureau of Yards and Docks, first to use standard rates developed by the system, reports savings of approximately $2

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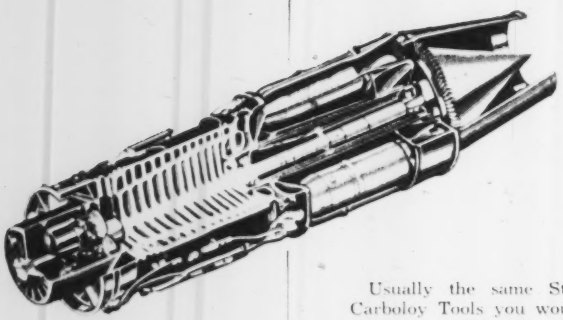


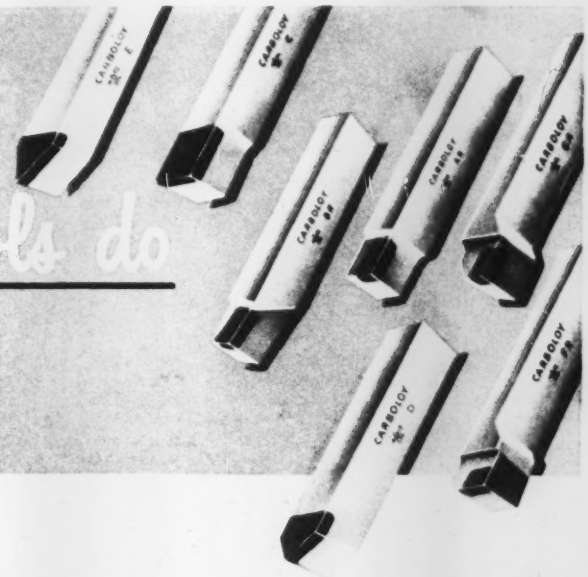
THE Broad Versatility of Standard Carboloy Tools and Blanks Includes Machining High-temperature Alloys

Today, titanium and most other so-called high-temperature alloys, such as those used in jet-engine manufacture, can be machined more successfully with cemented tungsten carbide than with any other cutting material . . . a great majority with straight tungsten carbide grades, such as found in Standard Carboloy Tools. Carboloy Tool engineers have intensively studied the machining of tough-alloy materials, and are able to present for your use the following:

Usually the same Standard Carboloy Tools you would use on cast iron will work very well. For heavy, rough cuts select a tough "Standard" grade. For lighter cuts, use harder, more wear-resistant grades. High-temperature alloys tend to work-harden. Standard Carboloy Tools are ideal because they hold a good cutting edge. Tools should be designed to be as free-cutting as possible; top side rake should be greater than normal, and a very small nose radius used. Cutting speeds vary widely between 75 f.p.m. and 600 f.p.m. Best feeds are .010" to .020" per revolution.

For specific, detailed advice on your particular problem, write to us, giving full details. Our engineers will promptly give you their recommendations.

# of tools Carboloy tools do machining?



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At Haun Drop Forge Co., Ltd. installation of a Wheelabrator Tumblast replaced a number of tumbling mills for cleaning drop forgings. Because Wheelabrating is so much faster cleaning time was slashed 75%. It also provides a better-cleaned surface and improved finish which speeded up all operations which follow cleaning.

Trimming time is reduced 25% and piercing operations simplified due to the thorough removal of all scale. Whereas it had been necessary to clean the pressure plate used in trimming thin section forgings — requiring 30 minutes time every two hours — this costly time-consuming task has been eliminated.

Let Wheelabrator engineers show you how to conserve manpower and reduce costs in your cleaning and finishing department. There's no obligation, of course. Send today for details.

American

Shell Molding Stainless

Molten stainless alloys are poured into shell molds at Solar Aircraft Co., San Diego, Calif. Solar employs the foundry technique to gain low-cost production of small, intricate high-quality castings. One characteristic is easy removal from shell molds after the castings have cooled

million at 19 shore stations during the last quarter of the 1952 fiscal year.

The work measurement system relates the number of workers to work loads through recording performance rates in measurable units for particular functions.

Book Gives Wrench Care Tips

How to get long, useful life from adjustable wrenches is the subject of a pamphlet called "First Aid for Adjustable Wrenches," produced by Utica Drop Forge & Tool Corp., Utica, N. Y.

Common ailments of long-used adjustable wrenches are dealt with in pictures, diagrams and "how to fix it" copy. Included is information on proper care and handling of new and undamaged wrenches to help prolong life and working efficiency. Copies are available free by writing to the company.

Simplimatic Catalog Published

Covering the latest model Simplimatic automatic lathe and its applications on everything from flywheels to axle housings, is a catalog published by Gisholt Machine Co., Madison, Wis. The 16-page book is available free.

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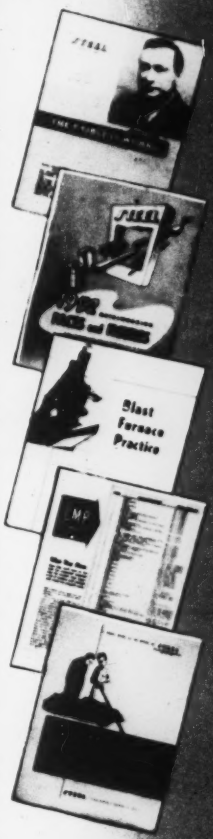

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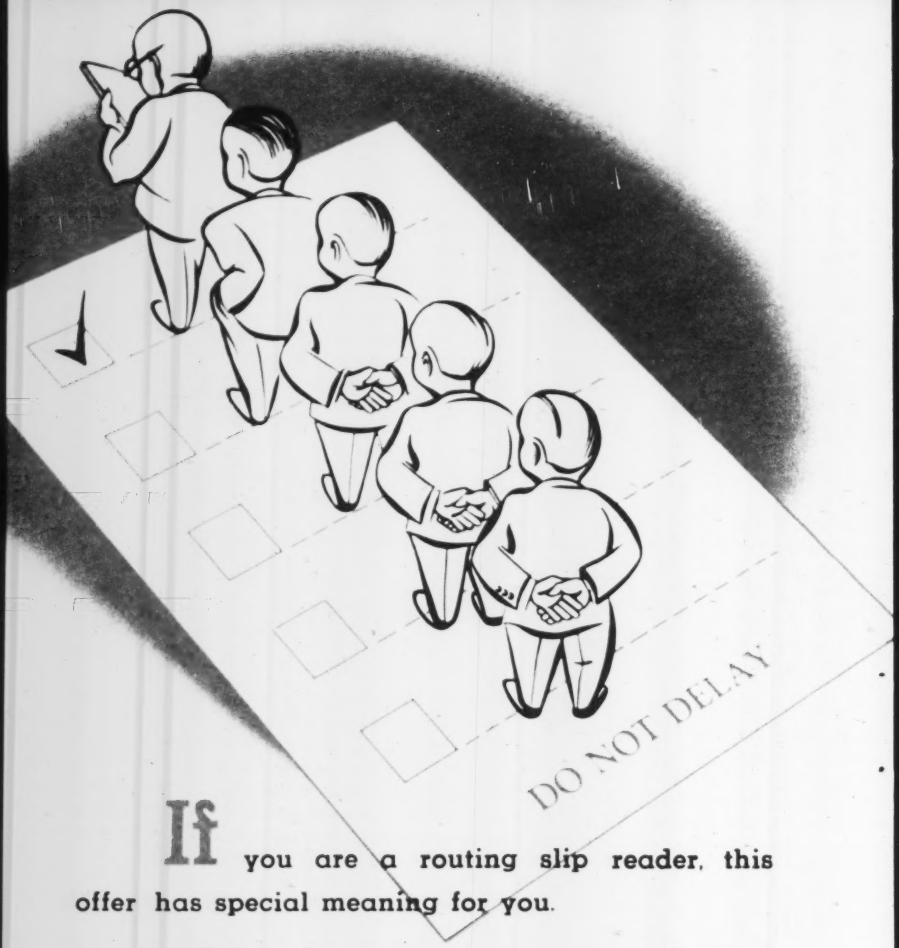

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BULLETIN 7328 FORM LT OVERLOAD RELAY AUTOMATIC RESET TYPE
BULLETIN 7311 TYPE P PLUGGING RELAY

The four devices, pictured above, are geared to provide the ultimate in heavy duty mill operation, with minimum maintenance.

CLARK Bulletin 7400 D C. Vari-Time Contactors have a built-in Vari-Time core that delays, for a pre-set definite time, the closing of the main contacts after the coil has been energized. This combination of timing device and contactor eliminates one timing relay for each accelerating step. Fewer devices spell "LESS MAINTENANCE."

CLARK Bulletin 7313 DC Timing Relays are simple, yet ruggedly constructed. They perform timing functions—time delay up to and including ten seconds—with high fidelity. Each Vari-Time core is hermetically sealed and guaranteed for the life of the apparatus and many have been operating successfully for twenty-five years, with no care or maintenance.

CLARK Bulletin 7328 D.C. Magnetic Overload Relays provide both inverse time limit and instantaneous protection utilizing the time proven Vari-Time principle. The sealed-in mechanism assures positive motor protection under the most adverse conditions.

CLARK Bulletin 7311 Plugging Relays feature rugged simplicity of design, and "fail-safe" operation. They afford maximum electrical and mechanical protection to the equipment.

Consult our nearest District Office for complete information on Clark DC Mill Control.

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Power to Fit the Machine

WISCONSIN-Powered General Electric Welder

Power to Fit the Job

Keeping snow removal equipment on the job often calls for on-the-spot repairs, handled here by a General Electric trailer-mounted WD-4200 welder. Power is provided by a V-type 4-cylinder Wisconsin Heavy Duty Air-Cooled Engine.

Engineering know-how and practical design of Wisconsin Engines make their choice a logical one for manufacturers building 3 to 30 horsepower equipment. Only Wisconsin Engines offer a choice of 11 different single-cylinder, 2-cylinder and V-type 4-cylinder models, 3 to 30 hp. Only Wisconsin Engines offer tapered roller bearings at both ends of the crankshaft, taking up all thrusts. In addition: Wisconsin Engines offer an OUTSIDE magneto with impulse coupling for quick starts, steady running. And, of course, fool-proof air-cooling eliminates cooling problems.

Write today for complete information about all models.

* Powered by V-type 4-cylinder Wisconsin Engine.

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World's Largest Builders of Heavy-Duty Air-Cooled Engines

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Why Lift Extra Tonnage?

Walker Lifting Magnet operates with valuable saving of electrical energy . . . high ratio lifting magnet gives maximum lifting with minimum weight. Walker's advanced design insures more payload per lift . . . gets into corners . . . reduces supplementary hand work.

LESS WEIGHT — MORE POWER!

O. S. WALKER CO. Inc.

WORCESTER 6, MASSACHUSETTS

Missile Has Gyro Heart

HEART of the advanced guidance systems for top-secret missile-control is the gyroscopic top, according to a report made by officials of Arma Corp., subsidiary of American Bosch Corp. The familiar child's toy, buried in the heart of complex electronic equipment, gives its accurate reference signals regardless of outside disturbing influences.

Radar or radio blocks, dummy heat sources or even high winds in the stratosphere will have no effect on its accuracy. Once set in motion, nothing short of a change in the earth's course in space can mislead the gyro-stabilized, gyro-navigated missile.

Principle Not New—Although the gyroscope has been used for navigation since World War I and to assist pilots for many years, its size, weight and accuracy has not been such to suggest use as a complete replacement for the human element until recently. It will not only fly the missile but will seek out predetermined locations in any sequence.

With this "thinking" ability, the coming system is believed the answer to limitations of the human pilot. Gyro-based systems would replace not only the pilot, but such things as oxygen equipment, pressure cabin, anti-G suit, ejection seat, parachute and other equipment weighing several hundred pounds.

Device Adjusts Boiler Fuel-Air

A device incorporated on boilers larger than 50 hp which provides low-fire starting and modulates the burner firing rate to accommodate variable steam demand is announced by Orr & Sembower Inc., Reading, Pa.

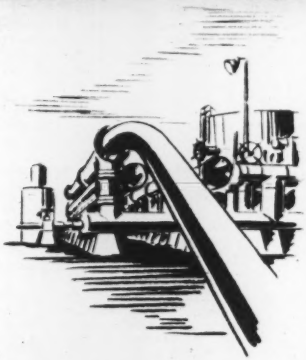
By properly proportioning air and fuel to the burner across the entire operating range, the intermediate firing rates are maintained at high efficiency for better cleanliness and economy of operation.

In the Powermaster boiler a pressure controlled potentiometer positions the damper motor. This adjusts the fuel valve and air damper according to steam demand as reflected in the boiler pressure.

HIGH TEMPERATURE RESISTANT

LOW TEMPERATURE RESISTANT

OIL and GAS RESISTANT



CHEMICAL RESISTANT

PRECISION RUBBER PARTS

By Stalwart!

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From more than 500 specially-developed stocks, including extreme temperature resistant Silicones, STALWART can fabricate precision molded, extruded, die-cut and machine or hand-cut parts. These parts will retain their desirable physical, chemical and dielectric properties under severe operating conditions and will give maximum performance in each specific application.

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ABRASION RESISTANT

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ENGINEERING B-W PRODUCTION

CALENDAR
OF MEETINGS

December 3, Steel Kitchen Cabinet Manufacturers Association: Annual meeting. Hotel Cleveland, Cleveland. Association address: Engineers Bldg., Cleveland 14. Executive secretary: Arthur J. Tuscany.

December 3, American Iron & Steel Institute: Regional technical meeting. Thomas Jefferson Hotel, Birmingham, Ala. Institute address: 350 Fifth Ave., New York 1. Meeting director: Frank Ragland.

December 3-5, American Leather Belting Association: Fall meeting. Hotel Commodore, New York. Association address: 320 Broadway, New York 7. Secretary: E. R. Rath.

December 3-5, Society for Experimental Stress Analysis: Annual meeting. Hotel McAlpin, New York. Society address: Box 168, Cambridge, Mass. Secretary: W. M. Murray.

December 4-6, Electric Furnace Steel Committee, American Institute of Mining & Metallurgical Engineers: Annual conference. Hotel William Penn, Pittsburgh. Institute address: 29 W. 39th St., New York 18. Secretary: Edward H. Hobbie.

December 7-10, American Institute of Chemical Engineers: Annual meeting. Hotels Cleveland and Carter, Cleveland. Institute address: 120 E. 41st St., New York 17. Secretary: Stephen L. Tyler.

December 11, American Iron & Steel Institute: Regional technical meeting. Hotel Warwick, Philadelphia. Institute address: 350 Fifth Ave., New York 1. Meeting director: Frank Ragland.

December 16-17, Industrial Truck Association: Winter meeting. Hotel Statler, New York. Association address: 900 F St., NW, Washington 4. Secretary: Wm. Van C. Brandt.

December 18, Material Handling Institute: Annual meeting. Hotel Statler, New York. Institute address: 731-732 DuPont Circle Bldg., Washington 6. Managing director: R. Kennedy Hanson.

January 11-13, Institute of Scrap Iron & Steel: Annual meeting. Hotel Commodore, New York. Institute address: 1729 H St., NW, Washington 6. Executive vice president: Edwin C. Barringer.

January 12-13, Industrial Furnace Manufacturers Association: Winter meeting. Hotel Cleveland, Cleveland. Association address: 420 Lexington Ave., New York.

January 13, Mining & Metallurgical Society of America: Annual meeting. Mining Club, New York. Society address: 11 Broadway, N. Y. Secretary: Lt. Col. Donald M. White.

January 15-17, National Tool & Die Manufacturers Association: Winter quarterly meeting. Sorrento hotel, Miami Beach, Fla. Association address: 907 Public Square Bldg., Cleveland. Secretary: George S. Eaton.

January 19-22, Plant Maintenance Conference: Cleveland Public Auditorium, Cleveland. Managers: Clapp & Poliak Inc., 341 Madison Ave., New York 17.

January 20-22, Caster & Floor Truck Manufacturers Association: Winter meeting. Roosevelt hotel, New York. Association address: 27 E. Monroe, Chicago. Secretary: H. P. Dolan.

January 21-22, Steel Shipping Container Institute Inc.: Winter meeting. Pierre & Hampshire House, New York. Institute address: 600 Fifth Ave., New York 20. Secretary: L. B. Miller.

January 22, American Coke & Coal Chemicals Institute: Regional meeting. Edgewater Beach hotel, Chicago. Institute address: 711 14th St. NW, Washington 5. Executive secretary: Samuel Weiss.

January 22-23, Steel Plate Fabricators Association: Annual meeting. Palmer House, Chicago. Association address: 37 W. Van Buren St., Chicago. Secretary: Dwight Evans.

January 26-28, Truck-Trailer Manufacturers Association: Annual meeting. Edgewater Gulf hotel, Edgewater Park, Miss. Association address: 1024 National Press Bldg., Washington. Managing director: John B. Hulse.

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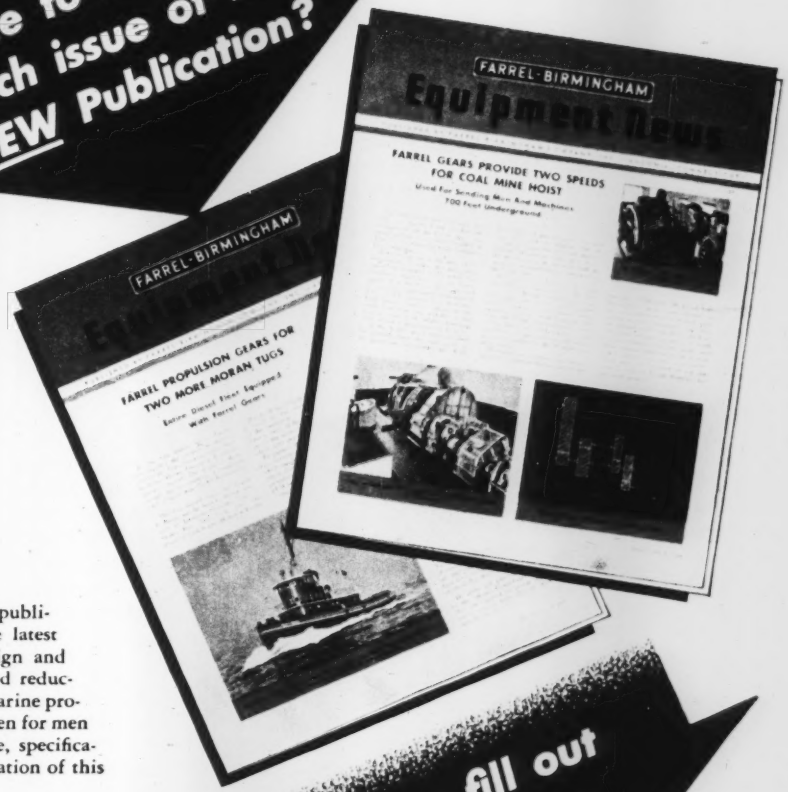
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Here is a new, four-page publication which tells of the latest developments in the design and application of gears, speed reducers, speed increasers and marine propulsion gearing. It is written for men in charge of the purchase, specification, maintenance or operation of this type of equipment.

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BEST WAY TO STRIP BIG INGOTS AT LESS COST

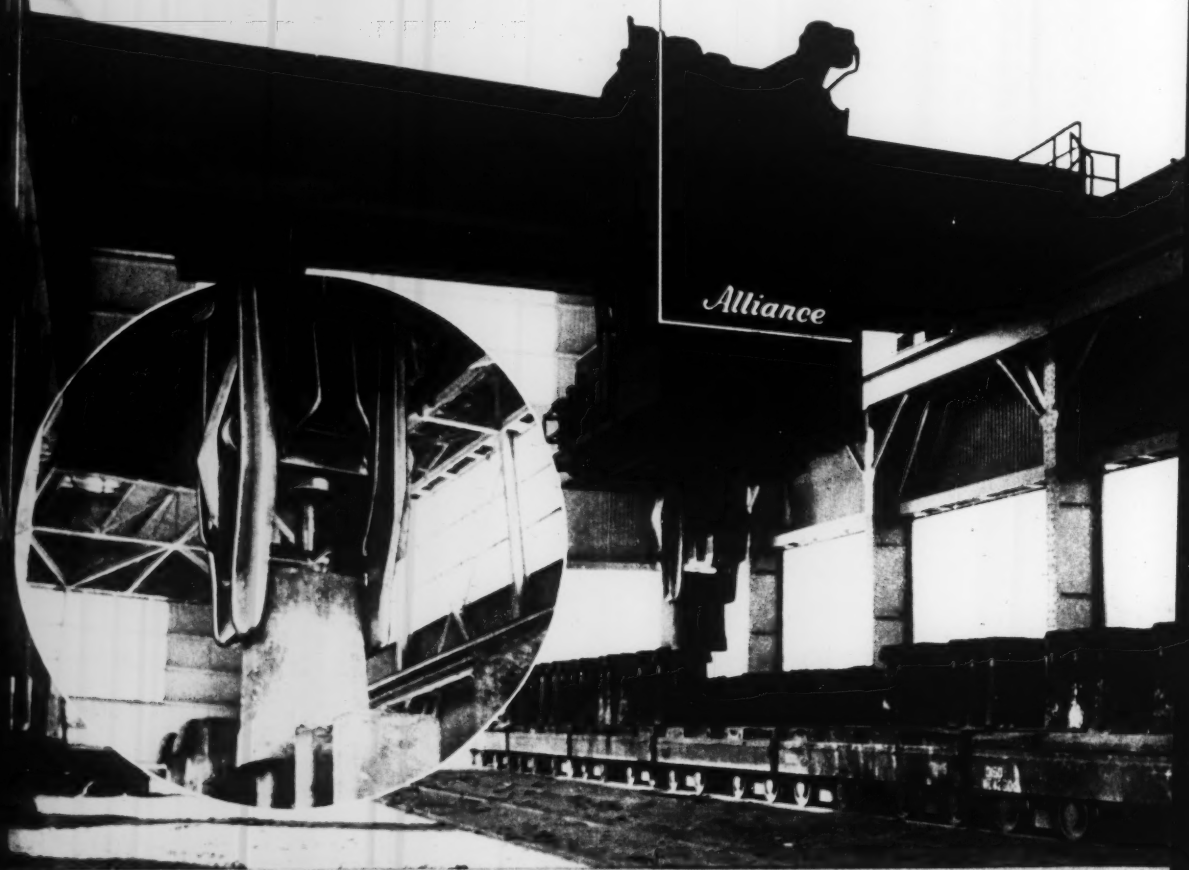
● The 200-ton push-pull, screw-type Alliance Stripper Crane, pictured below, is helping the Fontana Works of Kaiser Steel Corporation produce better ingots at less cost.

The stripper is equipped both with a retractable bullnose and gripping tongs so that the operator, unassisted, can make all necessary adjustments to strip either large end-up or small end-up ingots. The compact cab provides the operator with maximum visibility and safety, while the smooth-working mechanisms respond instantly to the slightest direction of simplified finger-tip controls.

Alliance . . . world's largest builder of the world's largest cranes . . . builds strippers having a name-plate rating of 400 tons and an overload rating of 1200 tons. This combination results in fewer stickers and consequent saving in costly alloy ingots as well as moulds. These strippers are equipped with the electric counterweight developed by The Alliance Machine Company which prevents the ingots from falling when stripped, thereby preventing damage to the ingot stools, axles, anti-friction bearings of the ingot buggies . . . reducing maintenance to a minimum.

Alliance Cranes like this can provide you with more than enough strength and versatility to meet steadily increasing production demands.

Let us help you plan for more economical lifting power in your plant with these big, dependable cranes. Write today for an analysis of your particular requirements.



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NEW PRODUCTS and equipment

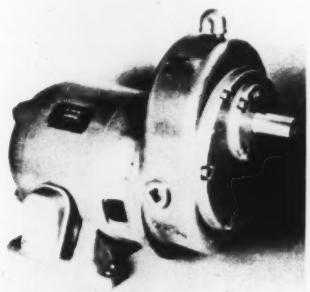
Reply cards on page 149 will bring you more information on any new products and equipment in this issue

Single-Reduction Gearmotor

. . . light-duty coupled service

Lifeline single-reduction gearmotor, type B, meets mounting limitation requirements peculiar to side entry agitators and mixers. It is suitable for light-duty coupled service applications on such equipment as fans and pumps. Unit is available in ratings from 1 to 30 hp, 780 to 420 rpm, AGMA classes I and II.

Gearmotor provides advantage



of delivering power at speeds comparable to slow-speed motors, although utilizing smaller high-speed motors. Westinghouse Electric Corp., Dept. ST, Box 2099, Pittsburgh 30, Pa.

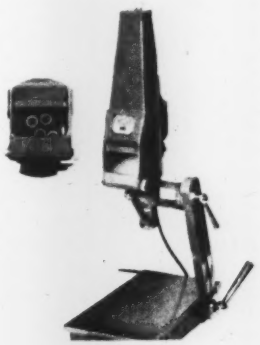
USE REPLY CARD—CIRCLE No. 1

Direct-Reading Projector

. . . reflects squareness directly

This auto-collimating unit shows on a convenient projection screen direct readings of squareness of a reflecting surface placed into its light path. Differing from contour projectors, the Projection Angle Dekkor does not show image of outline or surface of test object. Instead, reflection from its surface produces an image of a built-in scale. It is possible to inspect several surfaces simultaneously, determining their parallelism to each other.

Instrument is particularly adapted for production inspection in detecting squareness of holes to ref-



erence surfaces, parallelism of two or more bores or two or more planes and in other applications where reflectors can be placed on surfaces to be checked. Engis Equipment Co., Dept. ST., 431 S. Dearborn St., Chicago 5, Ill.

USE REPLY CARD—CIRCLE No. 2

Power Driven Conveyor

. . . connects stamping stations

All-purpose portable Pressparts power-driven conveyor moves stampings automatically between progressive operations. It can also convey scrap from press to tote boxes or conveyor belt. Standard sizes available: 6, 12 and 18-inch widths; 6, 11 and 16-foot lengths.

Belts are available with or without cleats, fabricated from rubber, cotton, stitched canvas or wire mesh. Conveyors are equipped with heavy-duty gearhead motors operating on 110 or 220 v, 25 or 60 cycles. Sage Equipment Co., Dept. ST, 31 Essex St., Buffalo 13, N. Y.

USE REPLY CARD—CIRCLE No. 3

Angle-Type Air Tool

. . . meets close-quarter needs

Three Keller angle-type drills are powered to drill holes in aluminum or brass from 9/16 to 3/4-inch diameter; in mild steel from 1/2 to 11/16-inch diameter. Especially desirable for close-quarter work, the 11C series comprises three different speed motors and five dif-

ferent angle attachments, all interchangeable.

Parts are also interchangeable, so only a small inventory of repair parts is needed. Two spindle types are available: threaded chucks and Jacobs taper spindles. Keller Tool Co., Dept. ST, Grand Haven, Mich.

USE REPLY CARD—CIRCLE No. 4

High Pressure Blower

. . . moves air at 450 cfm

An all aluminum, high pressure blower removes fumes, smoke, dust, sawdust and obnoxious odors. It moves up to 450 cubic feet of air

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TRADE

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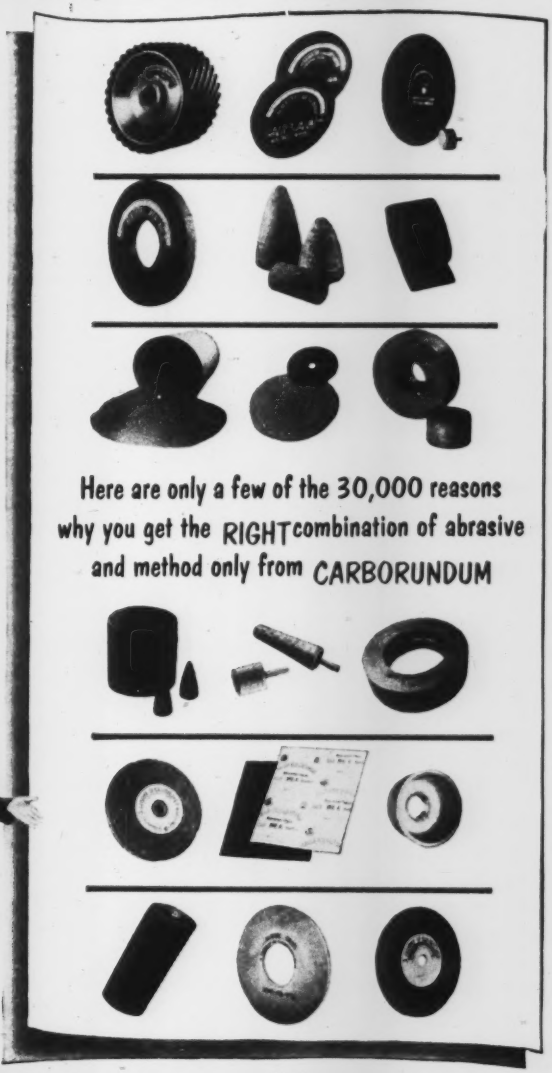
STEEL

switching to an abrasive BELT?

Grinding and polishing techniques have undergone major improvements in the past few years. One of many revolutionary developments is the "61" contact wheel, used with a coated belt on many operations previously performed with a bonded or a set-up wheel. In every case, the change has been made for just one reason — to yield a better result at a lower cost.

This is the kind of change that spells progress to every metalworking man who is battling against higher and higher costs. And this is the reason why you should welcome the CARBORUNDUM man or distributor salesman when he calls on you. There is nobody quite like him, for he's not in the position of having to back just one type of product, or two. He alone has the ability to help you specify the one RIGHT combination of abrasive product and abrasive method for every operation in your shop.

His counsel is experienced, practical, and above all completely free from bias — for he represents the only complete line of abrasives, from CARBORUNDUM, the world's best known brand name in abrasives. We suggest that you call him in today — it's to your profit!



Here are only a few of the 30,000 reasons why you get the RIGHT combination of abrasive and method only from CARBORUNDUM

RUNDUM

MARK

offers ALL abrasive products...to give you the proper ONE

HOLD IT TILL I SHAKE HANDS WITH OLD PIE TROUSDALE I AIN'T SEEN HIM FOR DAYS!
WHY PIE WHAT ARE YOU DOIN' OVER IN THIS NECK O' THE WOODS HOW ARE YOU?
OL' PIE IS TRAPPED! THEM GUYS LOVE TO MAUL AN MESS UP A FELLA WITH A CLEANER JOB
IT AIN'T TH' JOB IT'S TH' SHOP THEY USE SOL-SPEEDI-DRI!
ACROSS THE TRACKS

Old-fashioned value keeps it sales leader!

SOL·SPEEDI·DRI

Pound for pound, dollar for dollar, Sol-Speedi-Dri gives you more for your money, all factors considered. It's this old-fashioned value that keeps Sol-Speedi-Dri the biggest seller in the oil and grease absorbent field. You can count on consistent quality, too—laboratory testing sees to that. Send coupon today for free sample and literature about "dry-cleaning" your floors with Sol-Speedi-Dri.

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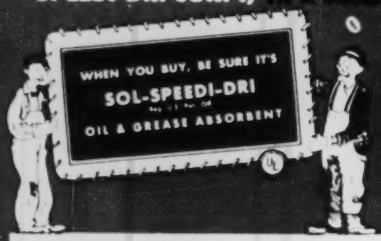

FREE SAMPLE: Fill out the coupon and mail today for free sample and literature.

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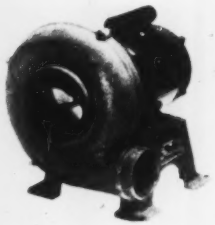
NEW PRODUCTS and equipment

per minute. On the standard unit, power is supplied by an enclosed 1 6-hp. 115 v. single phase, ac.

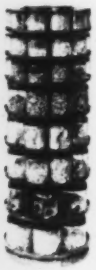


3150 rpm motor. Standard Electric Mfg. Co. Inc., Dept. ST, W Berlin 12, N. J.

USE REPLY CARD—CIRCLE No. 5

Rotating Storage Unit

. . . handles parts conveniently



Compact, rotating storage unit simplifies storage and handling of small spare parts. Series of circular trays accommodates various size glass jars. Simple stand on which these trays are assembled consists of a base, thrust bearing, mast and top cover. Complete assembly revolves as a single unit on ball bearings. Jars can be easily removed, but they cannot tip or fall.

Three models are available: 8, 5 and 3-tray stands equipped with 16, 8 and 4-ounce jars. Another advantage: For inventory purposes, jar weights are constant, making possible rapid weighing. Union Metal Mfg. Co., Dept. ST, Canton, O.

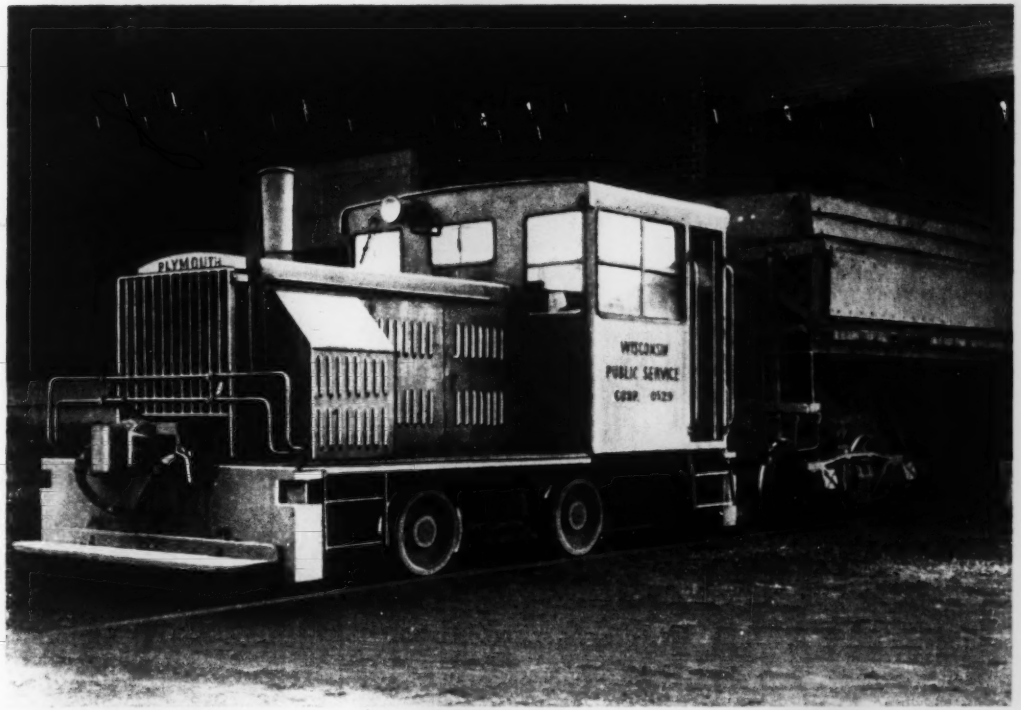
USE REPLY CARD—CIRCLE No. 6

Selenium Rectifier Arc Welder

. . . simplifies remote operation

Magnetic amplifier principle is employed as an integral part of the Miller selenium rectifier direct current arc welder. High short circuiting current insures sound electrode deposition and dense welds. Electric control makes remote operation simple and convenient.

Model 100 is made specifically



SMOOTH OPERATION *at low cost*

Important money is saved when dependable equipment does a first rate job with no breakdowns. On hundreds of locations smooth running Plymouth Locomotives are providing such savings—hauling, switching, and spotting big loads with cost-cutting efficiency.

Typical of the many users of Plymouth Locomotives is the Pulliam Plant of the Wisconsin Public Service Company of Green Bay, Wisconsin. There a 20-ton Plymouth, on the job up to 125 hours a month, hauls coal at a cost well below that of previous methods. Particularly popular with the operators is the smooth performance obtained with Plymouth's Torque Converter.

Discover now how Plymouth Locomotives can speed your hauling and cut costs. Send for catalog describing 3 to 70 ton sizes . . . gasoline, Diesel, mechanical, or hydraulic drive, and Diesel-electric . . . narrow and standard gauge.

PLYMOUTH LOCOMOTIVE WORKS, Division of The Fate-Root-Heath Company, Dept. A-1, Plymouth, Ohio.

PLYMOUTH® LOCOMOTIVES

ALSO MANUFACTURERS OF F-R-H CERAMIC MACHINERY

NEW PRODUCTS and equipment

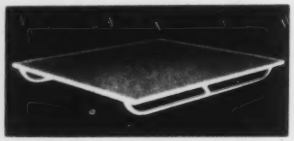
for light, direct-current applications where low amperage and crater elimination are essential. Miller Electric Mfg. Co., Dept. ST, Appleton, Wis.

USE REPLY CARD—CIRCLE No. 7

Tubular Steel Pallet

. . . permits easy movement

This eight-entry heavy duty steel pallet has tubular steel runners welded and braced to a rectangular angle-iron frame. The sled-like construction permits easy movement over uneven surfaces and obstructions. Pallets will be



made to meet customer's specific requirements in size and capacity. Econoweld Co., Dept. ST, 1805 Webster St., Dayton, O.

USE REPLY CARD—CIRCLE No. 8

Versatile!
General machine shop and maintenance work often require an all-purpose heavy duty open-gap bench press adaptable to the many kinds of operations involved. That's what makes this versatile 100-ton R D Wood HydroLectric Press valuable to you, from both cost and production standpoints. Moreover, it's used for machinery and appliance component assembly on a production basis, with the addition of suitable fixtures and accessories. It's made in various sizes and capacities.
• Write, without obligation, for literature.
HYDRAULIC PRESSES AND VALVES
INTENSIFIERS
R.D. Wood Company

Flask-Type Tumbling Barrel

. . . takes loads to 750 pounds

This flask-type, direct motor drive tilting tumbling barrel produces excellent work action for deburring and burnishing all types of precision ferrous and nonferrous parts.

The model is designed to magnify conventional tumbling action by restricting nature of flask-

shaped design. Machine is available in sizes for loads ranging to 750 pounds.

A $1\frac{1}{4}$-inch abrasion-resistant rubber or neoprene lining vulcanized to the barrel provides effective barrel insulation and protection for parts against nicking and scratching. Speeds go as low as 17 rpm for nonferrous and plastic parts. Standard speeds: From 10 to 35 rpm. Hupp Corp., Dept. ST, 1250 W. 76th St., Cleveland 2, O.

USE REPLY CARD—CIRCLE No. 9

Paint Spraying Equipment

. . . charges paint electrically

Ionic-gun, featured as a component of a paint-spraying setup, is designed on principle of charging paint electrically within the spray apparatus itself. To paint flat or smooth surfaces efficiently, paint is highly ionized so it differentiates between painted and unpainted surfaces, producing an even finish and penetrating oil cavities and crevices.

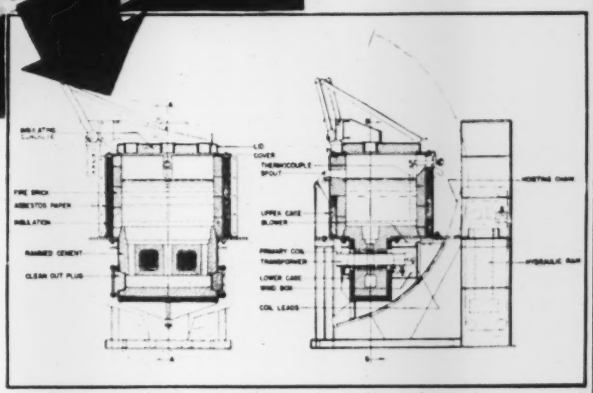
One result is said to be use of reduced amount of paint as well as improved product quality. Scien-

AJAX TAMA-WYATT INDUCTION FURNACES

Cut Foundry Melting Cost

Accurate records at the National Pressure Cooker Co., Eau Claire, Wisc., show that over a two-year period the Ajax induction furnace was capable of reducing melting costs by as much as 40%.

Partial view of National Pressure Cooker Co.'s melting room showing Ajax induction furnaces.



Cross section drawings of 166 kW. twin-coil Ajax Induction Furnace with hydraulic tilting device, same as shown in photograph above.

Due to the nature of their use, pressure cooker castings must maintain exceptionally high standards of casting quality. Not only does the induction furnace effect a saving in melting cost but, in addition, working conditions are greatly improved.

Note from the diagram above that the operation of the Ajax furnace is based on the induction principle, whereby energy is transmitted to the molten charge without actual contact, through the refractory walls. Only the metal is heated, and therefore there are no resistors or other parts having a higher temperature than is absolutely necessary for properly melting the charge. A gentle movement of the bath insures uniform temperature and homogeneous mixing of the ingredients. Linings are made of inert refractories which do not contaminate the melt. Temperature control is entirely automatic.

Write For Further Facts and Information

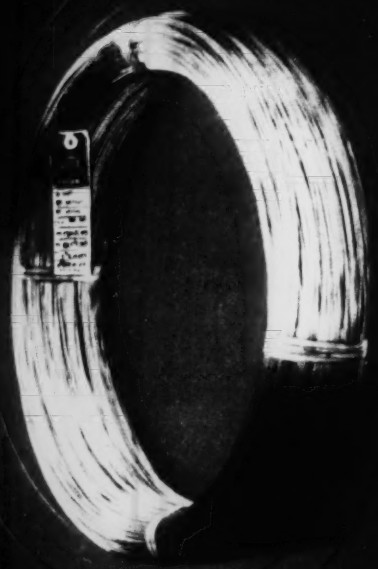
AJAX TAMA-WYATT

AJAX ENGINEERING CORP., TRENTON 7, N. J.

INDUCTION MELTING FURNACE

AJAX ELECTRO METALLURGICAL CORP., and Associated Companies
AJAX ELECTROTHERMIC CORP., Ajax Northrup High Frequency Induction Furnaces
AJAX ELECTRIC CO., INC., The Ajax Multiphase Electric Salt Bath Furnace
AJAX ELECTRIC FURNACE CORP., Ajax Wyatt Induction Furnaces for Melting

FOR SPECIALTY WIRES A SPECIALTY MILL...



Johnson plants in Worcester, Akron and Los Angeles are specialty mills, equipped for the development of specialty wires. All wire drawn in these plants is always under strict laboratory control all the way from the basic material to finished product.

JOHNSON

JOHNSON STEEL and WIRE CO., INC.

Worcester 1, Massachusetts

New York Philadelphia Detroit Akron Chicago
Atlanta Houston Tulsa Los Angeles Toronto

SUBSIDIARY OF PITTSBURGH STEEL COMPANY

NEW PRODUCTS and equipment

tific Electric, Dept. ST, 107-19 Monroe St., Garfield, N. J.

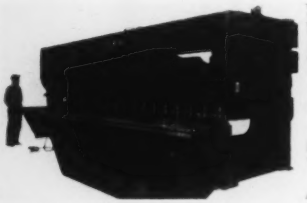
USE REPLY CARD—CIRCLE No. 10

Pivoted Blade Plate Shear

. . . uses no guides or slides

Series 3C20 Steelweld has shearing capacity of 20 feet by 3/16-inch steel plate. Pivoted-blade shearing principle is employed, the blade traveling in a circular path without the use of customary guides and slides.

Machine is operated by electric



foot switches which can be moved about the floor to the most convenient working position.

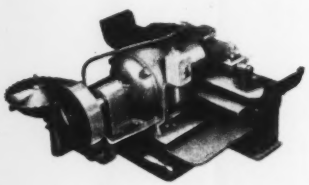
Clutch-brake mechanism permits material to be fed at a speed of 55 strokes per minute. Back-gage is motor driven with control buttons located at middle front. Cleveland Crane & Engineering Co., Dept. ST, Wickliffe, O.

USE REPLY CARD—CIRCLE No. 11

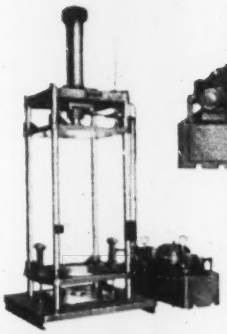
Combination Grinding Machine

. . . takes knives, saws, drills

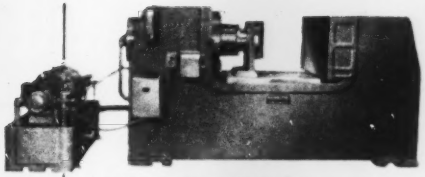
Double purpose type EE bench grinding machine handles machine knives up to 22 inches long, has



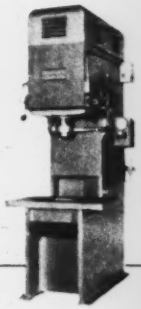
attachments to handle gumming of circular saws to 20 inches diameter and drills to 1-foot diameter. Both operations have a separate grinding wheel that runs independently of the other. Each is powered by the same 1 hp motor. On the knife



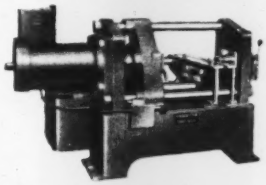
WATER HEATER TANKS are assembled with this 50-ton, 4-column press. Special hydraulic stripper plate raises tank from lower die after assembly.



TRACTOR WELDMENTS for main frames and roller frames are straightened with this 100-ton press. Horizontal design permits use of hoist for easier handling.

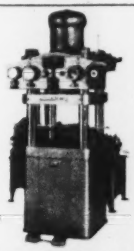


DIE CASTINGS are trimmed on this 25-ton, long stroke, open gap press. Controls reverse on distance; extremely high speed advance and return. Easy on dies. Scrap chute in table.



TRACTOR TRACK LINKS are press-fit assembled in this 50-ton, 3-column press. Assembly includes bushings and connecting pins. Press indexes for various sized links.

HEAVY DUTY straightening and forcing press. 150-ton capacity. Extra reach and large table permit handling heavy work.



HELICAL CUTTER BLADES are formed with this 75-ton, 4-column press. 2-step, timer-controlled operation forms part. Special attachment ejects part and relubricates dies with graphite.

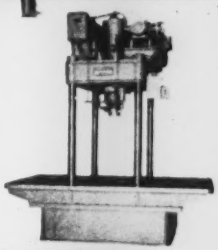
WHEN IT COMES TO PRESSES ...COME TO HANNIFIN

GENERAL PURPOSE 25-ton open gap press. Die cushion under table permits use for drawing operations.

FIBERGLAS PLASTICS are molded with this 50-ton, 4-column platen press. Automatic controls permit high-speed approach, slow closing on dies. Long stroke and extra "daylight" for deep parts.

When your production calls for hydraulic presses, investigate the Hannifin line that includes more than 75 standard models, capacities to 150 tons.

Quite probably you can select the press you need directly from the complete Hannifin catalog . . . or a Hannifin Field Engineer will demonstrate how easily one of these standard models can be modified to meet your requirements. Hannifin Corporation, 1117 South Kilbourn Ave., Chicago 24, Ill.



LARGE WELDMENTS are straightened on this 75-ton, 4-column press. Sensitive pressure control, extra large work table.

Hannifin Representatives Are at Your Service in These Leading Industrial Centers

Atlanta, Chicago, Cincinnati, Cleveland, Dallas, Dayton, Denver, Detroit, Houston, Los Angeles, Milwaukee, Minneapolis, Moline, New Orleans, New York, Philadelphia, Pittsburgh, St. Louis, Seattle, Richmond, Va.; Rochester, N. Y.; South Bend, Ind.; Washington, D. C.; Worcester, Mass. In Canada, F. F. Barber Machinery Co., Toronto, Montreal, Windsor, Hamilton, Vancouver.

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1125 S. Kilbourn Ave., Chicago 24, Illinois
Please send me Bulletin 130 on Hannifin Hydraulic Presses.

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Company.....

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choose Century PRECISION MADE MOTORS

to Drive Their Precision Production Equipment

Century Motors for Precision Grinding Equipment

- Century Motors are unusually free from vibration—the business end of the grinder is not handicapped.
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- Ball bearing enclosures seal the lubricant "in" and the dirt "out." Lubricated at the factory for several years' normal operation. Provided with plugs for relubrication when required.
- Century motors are styled and finished in standard machine tool color to match the fine equipment they drive.

Specify Century Motors on your new motorized equipment and for replacement. Available in wide range of types, 1/8 to 400 horsepower.

CENTURY ELECTRIC COMPANY
1806 PINE STREET ST. LOUIS 3, MISSOURI

Century C MOTORS

OFFICES AND STOCK POINTS IN PRINCIPAL CITIES

side, action is completely automatic.

A tool grinding post is attached to the machine. If necessary, attachments for wet grinding can be provided to supply coolants to the grinding contact. Samuel C. Rogers & Co., Dept. ST, 185-201 Dutton Ave., Buffalo 11, N. Y.

USE REPLY CARD—CIRCLE No. 12

Electric Unit Heaters

. . . for hard to heat areas

Chromalox UB series of blower-type electric unit heaters includes a large 20 kw model. It is suitable for floor, wall or ceiling mounting. Heater consists of a heavy-gage, sheet metal case with durable finish, one or more Chromalox Koilfin strip elements sheathed with steel for safety and a fractional horsepower motor blower. Edwin L. Wiegand Co., Dept. ST, 7579 Thomas Blvd., Pittsburgh 8, Pa.

USE REPLY CARD—CIRCLE No. 13

Tool Bit Holder

. . . no brazing required

When using the Huski-cut tool bit holder no brazing is required and the shank need never be ground. Fine adjustment is possible as there are no serrations. Inset can be adjusted without removing the holder from the machine. Wesson Co., Dept. ST, Detroit, Mich.

USE REPLY CARD—CIRCLE No. 14

Engine-Driven Arc Welder

. . . assures heat safety limits

Type WD-42GW engine-driven direct current arc welder with a 60 per cent duty cycle has current range of 40 to 250 amp. Welder can be used with a variety of electrode sizes for repair, maintenance and construction work. Consisting basically of the GE-type WD-42 generator and Wisconsin

. . . out of this came Aviation

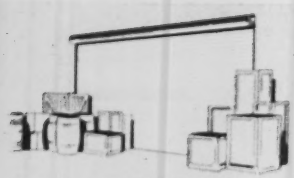
. . . an industry with vision

An industry that by its own imaginative design created the need for manufacturing with the same intensity of imagination and vision. Indiana Gear is such a manufacturer—a company of craftsmen dedicated to producing the finest in precision parts to back up the design intelligence of this great technologically-minded country.

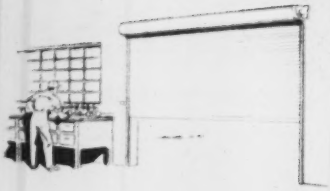
This 450 H.P. main gear box of approximately 12 to 1 reduction for the Sikorsky S-51 Helicopter was fabricated in its entirety by I.G.W.'s skilled craftsmen.

INDIANA GEAR

INDIANA GEAR WORKS, INC. • INDIANAPOLIS 7, INDIANA



All space in and around Kinnear-equipped doorways is fully usable at all times — both inside and outside the opening.



Work space and window areas can continue right up to the jambs of Kinnear Rolling Doors.

These are just a few of the reasons why you get maximum door efficiency, space economy and protection when you install

KINNEAR STEEL ROLLING DOORS

Ceiling space remains clear, for maximum use of cranes, conveyors, or hoists in and around door areas. Kinnear Doors can also be arranged to accommodate crane tracks extending through opening.

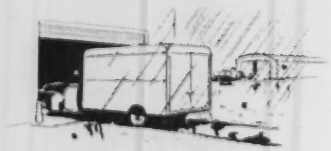
Proved and preferred through more than half a century . . . built *to fit* any opening . . . manual or electric operation. Write for new catalog today.

No other type of service door combines such high efficiency with the effective protection of Kinnear Rolling Doors.

The KINNEAR Manufacturing Co.
FACTORIES
1780-1800 Fields Ave., Columbus 16, Ohio
1742 Yosemite Ave., San Francisco 24, Calif.
Offices and Agents in All Principal Cities

Kinnear Motor Operated Doors open, close, or stop at the touch of a button, or by means of other types of manual or automatic control devices.

KINNEAR ROLLING DOORS



Wind is never a hazard to Kinnear Rolling Doors. The rugged steel slats are anchored in steel jamb grooves from floor to lintel.

The vertical action of Kinnear Rolling Doors is not blocked by snow, ice, gravel, or uneven ground.

NEW PRODUCTS and equipment

air-cooled engine, it is designed to fit crosswise in a standard pickup truck.

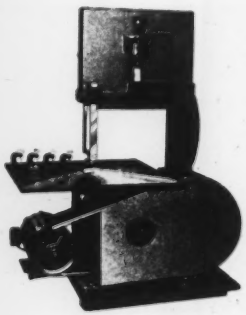
Forced ventilation keeps internal temperature within safety limits. Generator or engine can be removed easily for overhaul, being replaced by a standby unit. General Electric Co., Dept. ST, Schenectady 5, N. Y.

USE REPLY CARD—CIRCLE No. 15

Sheet Metal Saw

. . . blade speed: 125-2200 fpm

Heavy sheet metal saw is built with all-cast frame to provide stability and accuracy, reducing vibration to a minimum. Saw will cut 50 to 70 stacked metal sheets



at speeds up to 15 inches per minute. Blade speeds range from 125 to 2200 fpm.

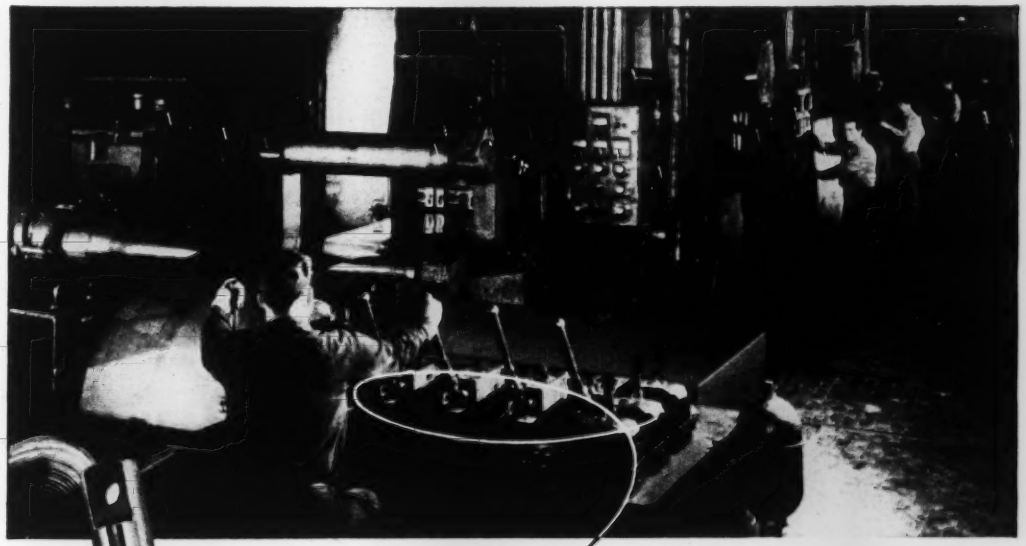
The 14-inch ball-bearing tool has a 20 x 22-inch table that permits handling large work. Case-hardened guides with carbide backup bearing adjustable to $\frac{1}{2}$-inch blade width assure positive blade control and cutting accuracy. Bett-Marr Mfg. Co., Dept. ST, Hopkins, Minn.

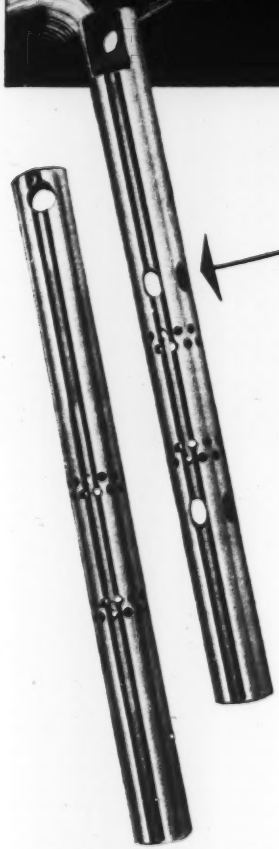
USE REPLY CARD—CIRCLE No. 16

Oil Burner

. . . uses atomizing air at 16 oz

LP oil burner gets flow low enough to prevent overriding of temperature, yet keeps burners lighted; gets wide range turndown; eliminates intricate adjustments on individual burners and necessity for separate source of high pressure air for atomizing fuel oil. It employs atomizing air at 16 ounces and provides equal flame charac-





Half-inch and three-quarter-inch plungers for Hunt "Quick-As-Wink" control valves are machined from Type 416 Free-Machining ENDURO Stainless Steel by C. B. Hunt & Son, Inc., Salem, Ohio.

Free-Machining ENDURO Helps Control Stainless Machining Costs

In pneumatic and hydraulic control valves, ENDURO Stainless Steel plungers help boss big mills like this . . .

The ENDURO plungers—through which air, water, and oil flow under thousands of pounds pressure — must resist corrosion, resist abrasion, and maintain a tight seal at all times. They must be fully balanced so that they cannot creep or crawl.

All this requires a lot of machining . . . upwards of 30 separate operations. Free-Machining ENDURO Bars are cold finished by Republic's Union Drawn Division especially for efficient, economical production of all such highly-machined parts. They provide close tolerances, accuracy of section, uniform soundness, and fine surface finish, together with the high physical and chemical properties of stainless steel. Two grades are 90% as machinable as Bessemer screw stock.

Free-Machining ENDURO also is available in hot rolled bars, and in wire. Republic metallurgists are ready to give prompt assistance on applications, processing and use. Write:

REPUBLIC STEEL CORPORATION
Alloy Steel Division • Massillon, Ohio
GENERAL OFFICES • CLEVELAND 1, OHIO
Export Department: Chrysler Building, New York 17, N. Y.

Republic ENDURO® FREE-MACHINING STAINLESS STEEL

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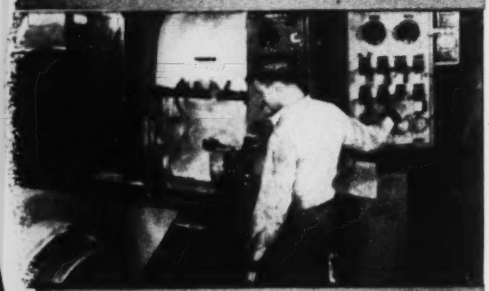

Production of steel strip and tubing to meet modern industry's rigid specifications demands the most modern equipment. During the last 30 years, The Wallingford Steel Co. has kept pace with developments in both machinery and techniques by sponsoring a continuous program of replacement and improvement. Today, not one piece of original equipment is still in use. The two-stand, four-high tandem rolling mill shown above is an outstanding example of the many precision built production machines in our completely equipped plant. Electrolimit continuous mill gages provide a constant check in holding strip to extremely close tolerance.

THE
WALLINGFORD
SINCE 1922
STEEL
CO.
WALLINGFORD, CONNECTICUT, U.S.A.

NEW PRODUCTS and equipment

teristics for both oil and gas. Bloom Engineering Co. Inc., Dept. ST, 857 W. North Ave., Pittsburgh 33, Pa.

USE REPLY CARD—CIRCLE No. 17

Precision Rotary Table

. . . mounts small precision work

Designed for mounting small precision work, this rotary table can be used on drill press, milling machine, shaper or surface grinder. Application possibilities include machining square and hexagon shapes, milling circular grooves

or T-slots, indexing clutch teeth or accurately spacing drilled holes.

Work table is 4½ inches diameter; three T-slots clamp the work. Table is rotated by worm gearing having a graduated collar and ball crank. Each graduation indicates a table movement of 3 minutes and one complete revolution of the ball crank turns the table 5 degrees. South Bend Lathe Works, Dept. ST, South Bend 22, Ind.

USE REPLY CARD—CIRCLE No. 18

Heavy Engine Lathe

. . . turns, faces, threads

Extra heavy 48-inch engine lathe provides power and rigidity for jobs that require heavy turning, facing and threading. Bed lengths run from 20-foot minimum up to any required length, by 5-foot increments. Bed width is 46½ inches and there is a continuous flange along the bottom that enhances rigidity.

Variable voltage drive provides wide range of spindle speeds with three gear changes, two through internal face plate drive and one direct to spindle. Normal spindle

ANOTHER
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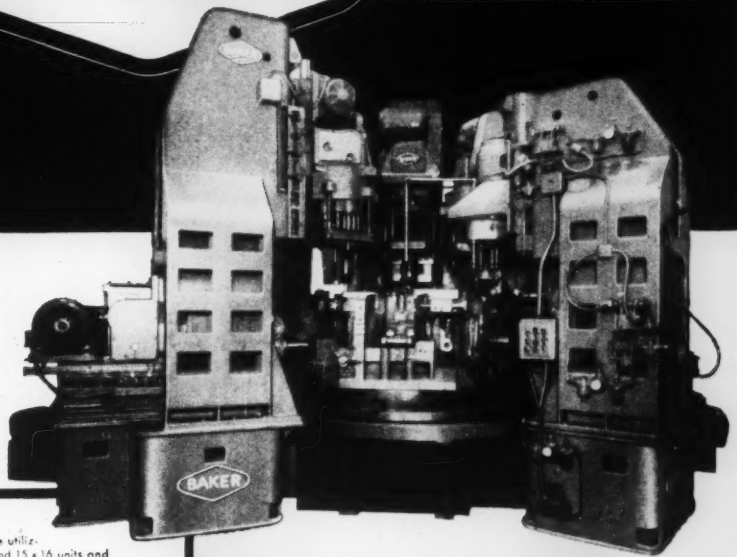
DRILLING PROBLEM

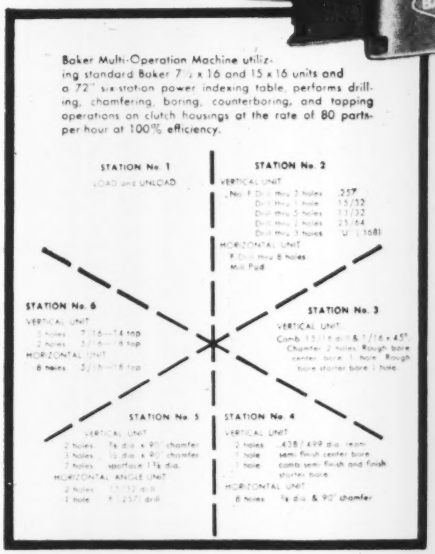
SOLVED

by

with a BAKER SPECIAL MACHINE



Baker Multi-Operation Machine utilizing standard Baker 7½ x 16 and 15 x 16 units and a 72" six-station power indexing table, performs drilling, chamfering, boring, counterboring, and tapping operations on clutch housings at the rate of 80 parts per hour at 100% efficiency.

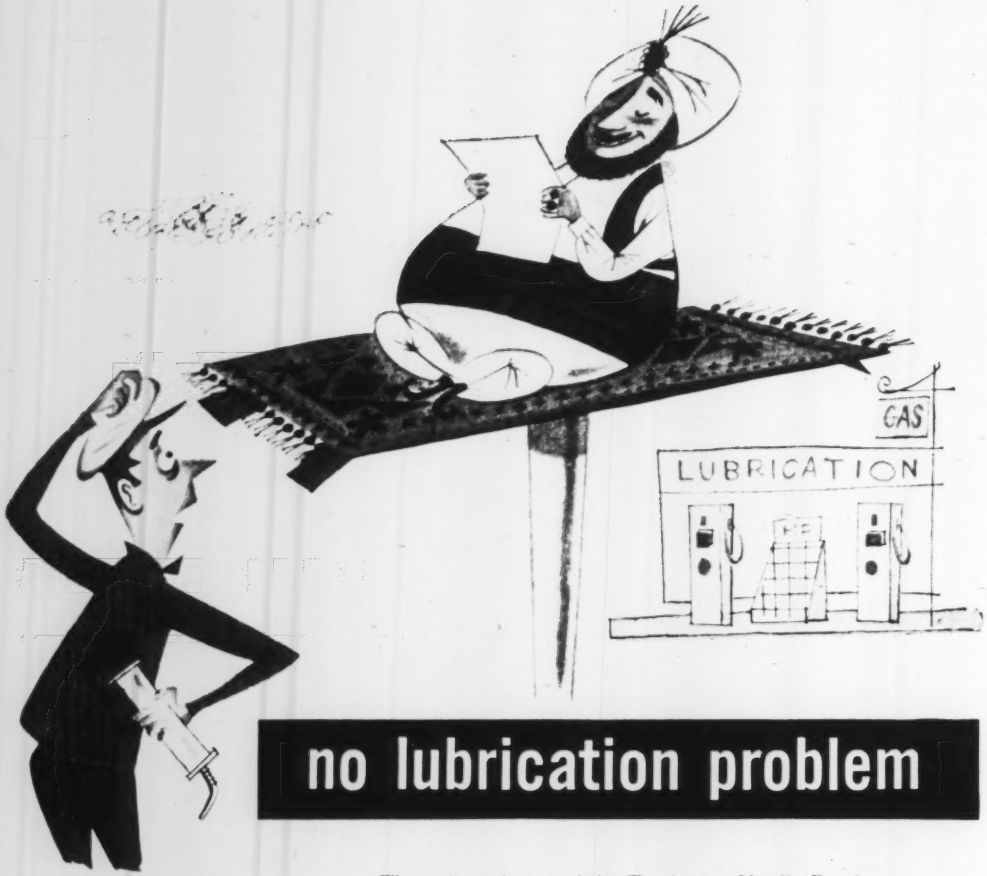

STATION No. 1
LOAD and UNLOAD
STATION No. 2
VERTICAL UNIT
No. 5 Drill thru 2 holes .257"
Drill thru 1 hole 15/32
Drill thru 5 holes 17/32
Drill thru 2 holes 23/64
Drill thru 3 holes "U" (.3681)
HORIZONTAL UNIT
8 Drill thru 8 holes
Mill Pad
STATION No. 6
VERTICAL UNIT
2 holes 7/16—14 tap
2 holes 5/16—18 tap
HORIZONTAL UNIT
6 holes 5/16—18 tap
STATION No. 3
VERTICAL UNIT
Comb. 13/16 drill & 1"/16 x 45°
Chamfer, 2 holes. Rough bore, center bore, 1 hole. Rough bore, starter bore, 1 hole.
STATION No. 5
VERTICAL UNIT
2 holes 1¼ dia. x 90° chamfer
3 holes .... dia. x 90° chamfer
2 holes spotface 1¾ dia.
HORIZONTAL ANGLE UNIT
2 holes 13/32 drill
1 hole "I" (.272) drill
STATION No. 4
VERTICAL UNIT
2 holes .428/.429 dia. ream
1 hole semi-finish center bore
1 hole comb semi-finish and finish starter bore
HORIZONTAL UNIT
6 holes 1¼ dia. & 90° chamfer

Baker Special Drilling Machines, composed of standard Baker units arranged to suit each individual problem, are designed for *productivity*. Units arranged in vertical, horizontal and angular planes perform multiple operations *faster . . .better . . . automatically . . .* with greater accuracy and efficiency. Consult Baker engineers for a better solution to your drilling problems.

..SINCE 1867

BAKER BROTHERS, INC. Toledo, Ohio

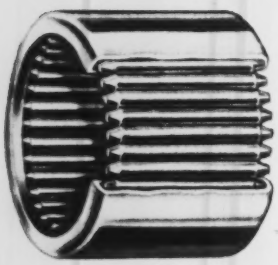
DRILLING...TAPPING...KEYSEATING and CONTOUR GRINDING MACHINES



no lubrication problem

The unique design of the Torrington Needle Bearing minimizes lubrication problems. The turned-in lips of the outer shell retain a large reservoir of oil and grease. And the full complement of small diameter rollers carries a thin lubricating film to all bearing contact surfaces. In some applications, the original lubricant will last for the life of the product.

Have you considered this and other Needle Bearing advantages—such as high radial load capacity, light weight and compact size—in terms of *your* product? Torrington engineers will welcome the opportunity to give you full details.



THE TORRINGTON COMPANY

Torrington, Conn. South Bend 21, Ind.

District Offices and Distributors in Principal Cities of United States and Canada

TORRINGTON *NEEDLE* BEARINGS

Needle • Spherical Roller • Tapered Roller • Straight Roller • Ball • Needle Rollers

speeds range from 1 to 144 rpm. Feed gear box provides threads that range from one-half to 56 per inch. Lead screw is $3\frac{1}{2}$ inches diameter, tailstock spindle 7 inches

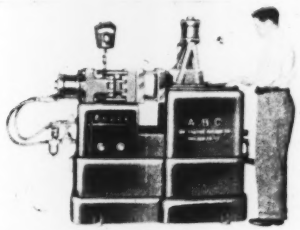
diameter. The lathe is also built in 54 and 60-inch swing. Simmons Machine Tool Corp., Dept. ST, Albany 1, N. Y.

USE REPLY CARD—CIRCLE No. 19

Zinc Die Casting Machine

. . . hits 1000 shots per hour

This $1\frac{1}{2}$-pound zinc die caster is air operated, capable of a free cycling in excess of 1000 shots per hour. Machine has electronically controlled panel, semiautomatic cy-



cling with adjustable timing dwell on opening and closing of the toggle.

Other features include 10 x 10 x $1\frac{1}{2}$-inch die blocks and four tie bars. A B C Die Casting Machine Co., Dept. ST, 339-41 W. 112th Place, Chicago 28, Ill.

USE REPLY CARD—CIRCLE No. 20

DC Power Supply

. . . for individual work stations

Selenium rectifier power supply, designed for installation at individual work stations, is made in 300 and 500 watts. It operates from a 115 v, 60-cycle line and furnishes from 90 to 135 v of filtered direct current output. Output voltage may be varied in approximately equal

Blake & Johnson is headquarters for patented Twin-Fast® twin-thread wood screws now available with Phillips head as well as slotted round, flat and oval heads — in brass and steel, bright finished — in all standard lengths and diameters and some special sizes; others to order.
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fastenings
TAPPING SCREW
AUTOMATIC SCREW MACHINE PRODUCT
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Electro Specific Purpose Grinding Wheels enable you to do many more operations with abrasive wheels than you may have thought possible. In most instances, the operations will cost you less, and you will gain in output per operating hour as well as in quality of output.

May we, wholly upon our responsibility, send a qualified Field Sales Engineer to see whether Electro Specific Purpose Grinding Wheels promise enough gains in your case, to warrant changing to them as so many other high-efficiency operators have done?

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344 Delaware Avenue, Buffalo 2, N. Y.
Regional Warehouse: Los Angeles 58, California
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NEW PRODUCTS and equipment

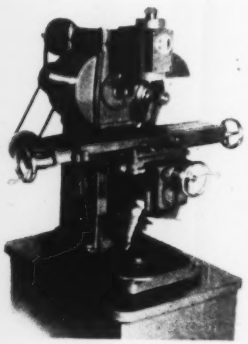
steps by a five position tap switch. Rapid Electric Co. Dept. ST, 2881 Middletown Rd., New York 61, N. Y.

USE REPLY CARD—CIRCLE No. 21

Compact Bench Mill

. . . has 15 separate speeds

Bench mill takes work 12 inches long, 9 inches high and 5 inches wide on its 5 x 20-inch table surface. Spindle has Timken bearings and operates at 15 separate forward or backward speeds. Table



T-slots are milled from solid, insuring inflexible anchoring of the work itself.

Work is power fed at 0.003, 0.006 or 0.012-inch per spindle revolution. Recommended motor is ½-hp. Rotex Punch Co., Dept. ST, 4726 E. 12th St., Oakland, Calif.

USE REPLY CARD—CIRCLE No. 22

Gravity Feed Oilers

. . . with transparent reservoir

A line of large capacity aluminum alloy bodied gravity feed oilers is suitable for locations where vibration is excessive. Drop feeding of oil is controlled by a precision needle valve that can be opened

USE A REPLY CARD

Just circle the corresponding number of any item in this section for more information.

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71. Liquid Level Control

Automatic Control Co.—The Autocon Bubbitrol is a bubbler type pressure-operated liquid level control which operates from level variations of inches. Its use in industrial processing is covered in 8-page illustrated bulletin 1650.

72. Belt & Bucket Elevators

Hewitt-Robins, Inc., Robins Conveyors Div.—Standard and special belt and bucket elevators are available in sizes and capacities to meet practically any bulk materials handling need. Types of materials handled, discharge styles, available buckets and related information are given in 20-page illustrated bulletin 151.

73. Building Maintenance

Flexrock Co.—Do you want a 64-page handbook, jammed with instructions and data on a complete line of building construction and maintenance products? If so, we suggest illustrated handbook No. 7 which deals with floor materials and finishes, construction and maintenance, leak stopping and moisture sealing. Step-by-step guidance is given on application of these products.

74. Hydraulic Lift

Century Products Co.—Uses of the Century 1000 manually propelled hydraulic lift are detailed and illustrated in company brochure. Construction features, hydraulic pump operation and specifications are covered for the 1000-lb. capacity unit, designed for light and medium materials handling.

75. Control Valves

Black, Sivalls & Bryson, Inc.—Revised diaphragm control valve section of the "Climax Control Equipment" catalog details control units for chemical and other industries where even slight leakage is not permissible; valves for controlling flow of gases that require greatly increased volume upon release of pressure or liquids that are subject to flashing; and units for changing direction of flow or splitting or mixing.

76. Standard Thread Gages

Detroit Tap & Tool Co.—24-page illustrated bulletin SG-52 contains specifications and prices of complete line of standard thread gages including plug, ring, thread setting plug and pipe thread types. Tolerances and ordering instructions are included.

77. Toolroom Lathe

Cincinnati Universal Machine Co.—The German built Weipert Lathe specially adapted for use in American industry is described and illustrated in 4-page bulletin. Lathe has U. S.-made Timken bearings, American Standard taper key spindle nose and is available in 20-in. swing and 60, 78 and 96-in. center distances. Eighteen spindle speeds range from 12 to 600 rpm.

78. Caustic Soda

Dow Chemical Co.—Revised booklet covers all phases of caustic soda such as manufacture, chemical and physical properties, economics involved, methods of handling and storage, technical data, methods of analysis and first aid treatment of caustic burns.

79. Electronic Air Cleaners

Trion, Inc.—Electronic air cleaners which free air of dust, dirt, smoke, bacteria, pollen, and other contaminants through electrostatic precipitation are subject of 12-page descriptive catalog E-60. Systems components are described as well as 4 separate models with complete specifications and engineering data.

STEEL
Penton Building, Cleveland 13, Ohio

12-1-52

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80. Pearlitic Malleable

Belle City Malleable Iron Co.—Characteristic and properties of Belmalloy pearlitic malleable are summarized briefly in 4-page illustrated folder No. 12. Typical uses, particularly in mobile equipment, are shown.

81. Power Tools

Powermatic Co.—Band saws, contour saws, band filers, drill presses, tool grinders, jig saws, jointers, lathes, planers, shapers and sanders are some of the power tools described in 52-page illustrated catalog 52. These machines are designed for cutting, shaping, drilling and finishing wood, metal, fiber, plastics and similar materials.

82. Welding Analyzer

Brush Development Co.—2-page illustrated data sheet 841 deals with the new welding analyzer which graphically records welding current, electrode force and other variables in both single and three phase resistance welding.

83. Wear & Surface Finish

Gisholt Machine Co.—"Wear and Surface Finish" is factual 80-page book which shows "why ground and machined surfaces have been unsatisfactory, what are the basic causes of wear, and describes an efficient and inexpensive method of producing a new standard of surface quality." It delves into measurement of surface roughness, relation of surface finish to wear and describes the Superfinish process developed by this company.

84. Forging Furnace

Delaware Tool Steel Corp.—Principle of operation and design features of Forgeatrol furnace are outlined in 6-page illustrated bulletin DF-2. Cold shank heating is possible in furnaces which have even heating from wall to wall. Models available and specifications of each are included.

85. Engineering Shipping Boxes

Hinde & Dauch Paper Co.—No. 8 in the Little Packaging Library is entitled "How To Engineer Corrugated Shipping Boxes." It begins with the problem and questions that must be answered and takes the reader through the chain of events in the H & D organization that lead to *the* box for *the* application.

86. Power Screwdrivers

Detroit Power Screwdriver Co.—Complete specifications, application data and illustrations for line of power screwdrivers, fixtures, hopper units, nut drivers and special assembly machines are presented in this 40-page catalog. Machines drive standard machine, wood, sheet metal and self-tapping screws.

EDITORIAL REPRINTS:

87. Quality Control

Look at your inspection setup. If you're making chemical analyses, or inspecting patterns or castings, chances are you have the basic elements needed to start a quality control program. W. J. Sommer of Plainville Casting Co. shows in STEEL reprint that "Quality Control Is in the Reach of Small Foundries."

88. Heat Resistant Alloy

"New Alloy Tough in the Hot Spots" is title of STEEL reprint which describes field testing in furnaces and other hot applications of a new alloy developed at Blaw-Knox Co.'s National Alloy Steel Div. Alloy called NA22H shows high strength and oxidation resistance at 2200 F.

89. Plating Gun Bores

Brief illustrated STEEL reprint describes mass-production technique for plating 90-mm gun bores which transforms spiral rifling to mirror-like smoothness that resists wear. Request reprint "Volume Plating Method Increases Gun Tube Life."

90. Foreign Machine Tools

STEEL reprint entitled "Foreign Machine Tools" combines articles by R. M. Kovel, Case International Co. president, and T. Berna, NMTBA general manager, which present, respectively, pro and con views relative to imported machines as our answer to a present need, or a threat to security. Consideration is given to such angles as import duty, prompt delivery, price gouging, possibility of war, foreign trade, etc.

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Please send literature or detailed information on subjects circled at left to—

or closed by a knurled capscrew. Hairline adjustments can be made because of a friction lock arrangement and any setting can be locked off against severe vibration. Oil-Rite Corp., Dept. ST, 2318 Waldo Blvd., Manitowoc, Wis.

USE REPLY CARD—CIRCLE No. 23

Abrasive Blade Cutters

. . . cut nonferrous, steel forms

Three types of abrasive blades are designed to cut through the entire range of building and industrial materials. Types are packaged in different colors to designate respective uses. Red label blade cuts compositions including nonferrous metals; green label,

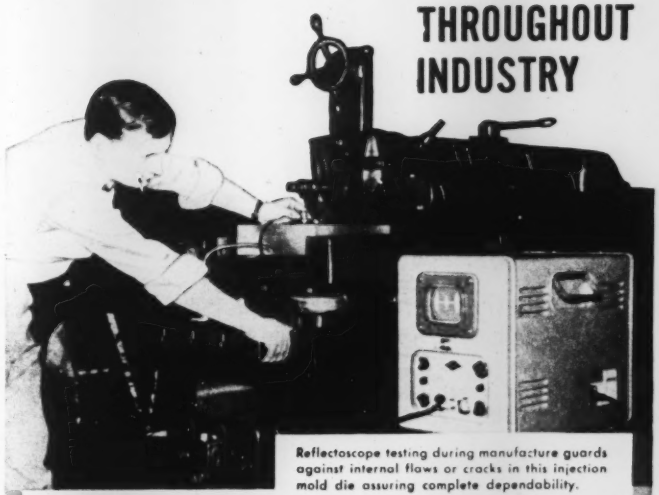
such materials as porcelain and plastics; and blue label, iron and steel in its various forms.

Blades are reinforced and semi-flexible to reduce danger of breakage. In an added application, the side of the blade can be used as a grinding wheel to deburr, bevel or polish. Blades are available in 6, 7 and 8-inch diameters. They can be used on any electric saw. Porter-Cable Machine Co., Dept. ST, Exchange St., Syracuse 8, N. Y.

USE REPLY CARD—CIRCLE No. 24

USE A REPLY CARD

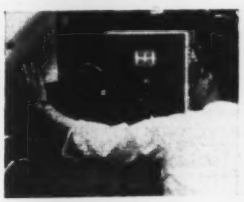
Just circle the corresponding number of any item in this section for more information.



THROUGHOUT INDUSTRY

Reflectoscope testing during manufacture guards against internal flaws or cracks in this injection mold die assuring complete dependability.

Reflectoscope testing prior to machining eliminates wasted time and loss of materials resulting from faulty metal.



Testing this large finished die assures freedom from internal defect and possible failure in-use.

Assure CUSTOMER SATISFACTION

Eliminate WASTE • REJECTS

WITH Sperry

ULTRASONIC TESTING

The Chicago Impression Die Company — makers of plastic injection mold dies — is one of the many firms throughout industry that has found two important benefits from Sperry **Ultrasonic** Reflectoscope testing.

First — Testing of raw materials **before** processing eliminates the many man- and machine-hours that are wasted when hidden flaws or inclusions are discovered during manufacture. Second — Reflectoscope testing the finished products assures that no flaws have developed that might cause failure in use. Customer acceptance and satisfaction is assured.

Simple, economical and effective in operation, the Reflectoscope penetrates up to 30 feet in solid metal with an ultrasonic beam that dependably detects and locates hidden internal flaws, defects and inclusions.

Write today for complete information; learn how you can reduce testing costs and improve quality control in your plant. The Sperry Reflectoscope is available through Sperry's convenient, economical, in-plant Testing Service, conducted by Sperry's experienced Inspection Engineers. Ask for details concerning sale or rental of the Sperry Ultrasonic Reflectoscope.

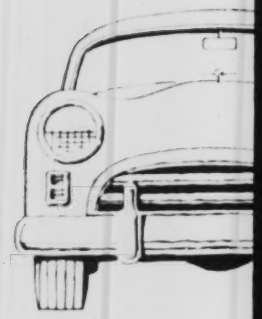
Sperry

SPERRY PRODUCTS, INC.

612 SHELTER ROCK ROAD

Danbury, Connecticut

REPRESENTATIVES IN PRINCIPAL CITIES



This intricate maze of metal is the valve section of a popular automatic transmission, cast in Gray Iron.

6 Reasons why the final choice was GRAY IRON!

1. Greater rigidity, strength and dimensional stability
2. Greater accuracy—can be held to closer tolerances
3. Greater wear resistance
4. Does not permit dirt to imbed, as do the softer nonferrous materials
5. Desirable thermal expansion characteristics
6. Economy

Intricate components such as the section shown here are economically practical only as integral castings. The final question then becomes—in what material shall they be cast?

This valve section was first experimentally cast in a nonferrous material. However, the final choice was Gray Iron, for the practical reasons listed at the left. These same basic advantages of Gray Iron could well apply to one of *your* current design problems.

Write for technical information on the many advantages of the Gray Iron casting process.

Make it Better with Gray Iron
Second largest industry in the metal-working field

GRAY IRON FOUNDERS' SOCIETY, INC.
NATIONAL CITY-E. 6th BLDG., CLEVELAND 14, OHIO

The Market Outlook

STEELMAKERS are putting aside their fears of a raw materials shortage this winter.

A Dec. 1 inventory indicates their stocks of iron and steel scrap and coke are much larger now than they were a year ago and iron ore supplies have been building up after a setback from the steel strike that halted ore shipments last summer.

This time last year there was a nationwide drive to get out the scrap. Then mills had 4.4 million net tons of scrap on hand. Now they have 6.8 million. At producers' ovens there now are 2.8 million net tons of coke. A year ago there were only 1.7 million.

ENOUGH ORE—While there are 51 million net tons of iron ore at furnaces and lower lake docks now, compared with 54.9 million a year ago, the lakes shipping season is not quite over yet, and rail shipments during the winter can supplement the ore pile. Even with the increased consumption of the expanded blast furnace capacity it is believed there'll be enough ore to carry through until the lakes shipping season reopens next spring.

Larger stocks of raw materials are necessary now for full operations than a year ago, for the steel industry's capacity is 6 per cent greater than it was at this time last year.

WINNING ACCEPTANCE—More and more this expansion is being accepted as realistically in line with the needs. Ever since the expansion was projected there has been much debate over whether or not it's too big.

A. B. Homer, president, Bethlehem Steel Co., says, "If we accept the gross national product index and the Federal Reserve Board index of industrial production as being reflective of the country's rate of growth and increased requirements, the indications are that steel capacity is not now excessive."

UP AND ONWARD—The present goal of approximately 120 million net tons of steel producing capacity will not be a stopping point, thinks Hiland G. Batcheller, chairman, Allegheny Ludlum Steel Corp., Pittsburgh. In another 20 years we will need a capacity of 150 million tons of ingots, he believes. He bases his thinking on the rise in population, new uses for steel and new ways of making steel stronger, harder and more useful. The population in another 20 years is supposed to be up to 190 million persons. For every 1 million increase in population between now and then we'll need another million tons of steel ingot capacity, Mr. Batcheller contends.

BREAKEVEN POINT—Even if further increases in capacity do become necessary, economic conditions may bring some downward fluctuations in production from time to time. How much of a drop the steel industry can stand with operating costs as high as they are has been a recurring question. Bethlehem Steel, says Mr. Homer, believes it can do as well profitwise at 85 to 90 per cent of capacity as it is now doing at full capacity.

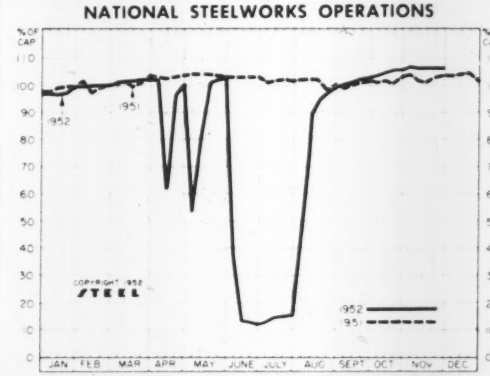
FULL SPEED AHEAD—Pressure to produce at full tilt is so great now that even a holiday does not cut ingot operations. In the Thanksgiving Day week ended Nov. 29, production of steel for ingots and castings was unchanged from that of all of the preceding weeks of November, 106 per cent of capacity.

BRIGHTER—While major steel products are in strong demand, many consumers who were badly pinched supplywise during early November are getting relief now. There is even a bright spot in the supply of scarce heavy plates of carbon steel. They're flowing from mills more steadily than they were. Supply of lighter and narrow carbon plate continues to increase. Silicon plates, particularly in the heavy gages, are in sharp demand for atomic energy and Navy requirements.

Demand for hot-rolled and cold-rolled carbon steel sheets is well sustained, but there is a little easing in coated sheets.

Hot-rolled and cold-finished carbon bars in large sizes continue in tight supply.

NATIONAL STEELWORKS OPERATIONS



DISTRICT INGOT RATES

Percentage of Capacity Engaged at Leading Production Points

	Week Ended Nov. 29	Change	Same Week 1951	Same Week 1950
Pittsburgh	104.5	-0.5*	101	53
Chicago	110	-1.5*	104	104
Mid-Atlantic	101	0	101.5	98
Youngstown	106	0	106	40
Wheeling	100.5	0	99.5	94
Cleveland	112.5	0*	104	78.5
Buffalo	106.5	0	104	104
Birmingham	106.5	-0.5	105	100
New England	93	-8	91	88
Cincinnati	99	0	102	100
St. Louis	84	2	93.5	90.5
Detroit	106	0	106	102
Western	106	-2	107	101
Estimated national rate	106	0	103.5	81.5

Based on weekly steelmaking capacity of 2,077,040 tons in 1952, 1,999,034 tons for 1951, 1,928,721 tons for second half, 1950, 1,906,268 tons for first half, 1950.

* Change from revised rate for preceding week.

The Metalworking Outlook p. 39 Production-Engineering News p. 75

Composite Market Averages

FINISHED STEEL PRICE INDEX Bureau of Labor Statistics	Nov. 25 1952	Nov. 18 1952	Month Ago	November Average
1947-49=100	169.2	169.2	169.2	169.2

AVERAGE PRICES, BUREAU OF LABOR STATISTICS
Week Ended Nov. 25, 1952

Units are tons or cents except where otherwise noted below in parentheses. For complete description of products see chart following p. 87 STEEL, Sept. 8, 1952

Rails	$ 5.775	Sheets, C.R. carbon	$ 5.275
Track spikes	6.650	Sheets, galv.	6.915
Track bolts	8.958	Strip, C.R. carbon	5.109
Tie plates	4.775	Strip, C.R. stainless (lb.)	0.325
Joint bars	4.925	Pipe, black, buttweld (100 ft.)	7.060
Plates, carbon	4.256	Pipe, galv. buttweld (100 ft.)	8.857
Structurals, shapes	4.266	Boiler tubes (100 ft.)	31.663
Bars, hot rolled, carbon	4.526	Tin plate (100 lb. base box)	8.950
Bars, alloy	6.575	Terne plate (100 lb. base box)	7.750
Bars, stainless (lb.)	0.149	Wire, carbon, merchant	6.075
Bars, carbon	4.100	Wire, fence, galv.	6.458
Bars, reinforcing	4.050	Nails (100 lb. keg)	7.390
Bars, C.F., carbon	5.925	Wire, barbed (80 rod spool)	5.920
Sheets, H.R., carbon	4.125	Woven wire fence (20 rod roll)	13.720

FINISHED PRICE INDEX, Weighted Calculated by STEEL*	Nov. 25 Week Ago	Week Ago	Month Ago	Year Ago	5 Yrs Ago
Index (1935-39 av. = 100)	181.31	181.31	181.31	171.92	129.28
Index in cents per lb.	4.912	4.912	4.912	4.657	3.502

ARITHMETICAL PRICE COMPOSITES Calculated by STEEL*					
Finished Steel, NT	$110.98	$110.98	$110.98	$106.32	$76.09
No. 2 Fdry. Pig Iron, GT	55.04	55.04	55.04	52.24	36.80
Basic Pig Iron, GT	54.96	54.96	54.96	52.16	36.42
Malleable Pig Iron, GT	55.72	55.72	55.72	54.27	37.54
Scrap, Gross Ton	43.00	43.00	43.00	43.00	40.42

* For explanation of weighted index see STEEL, Sept. 19, 1949, p. 94; of arithmetical price composites, STEEL, Sept. 1, 1952, p. 130.

Comparison of Prices

Comparative prices by districts in cents per pound except as otherwise noted. Delivered prices based on nearest production point.

FINISHED MATERIALS	Nov. 25 Week Ago	Week Ago	Month Ago	Year Ago	5 Yrs Ago
Bars, H.R., Pittsburgh	3.95	3.95	3.95	3.70	2.90
Bars, H.R., Chicago	3.95	3.95	3.95	3.70	2.90
Bars, H.R., del. Philadelphia	4.502	4.502	4.502	4.223	3.318
Bars, C.F., Pittsburgh	4.925	4.925	4.925	4.55	3.55
Shapes, Std., Pittsburgh	3.85	3.85	3.85	3.65	2.80
Shapes, Std., Chicago	3.85	3.85	3.85	3.65	2.80
Shapes, del. Philadelphia	4.13	4.13	4.13	3.918	2.954
Plates, Pittsburgh	3.90	3.90	3.90	3.70	2.95
Plates, Chicago	3.90	3.90	3.90	3.70	2.95
Plates, Coatesville, Pa.	4.35	4.35	4.35	4.15	3.15
Plates, Sparrows Point, Md.	3.90	3.90	3.90	3.70	2.95
Plates, Claymont, Del.	4.35	4.25	4.35	4.15	3.15
Sheets, H.R., Pittsburgh	3.775	3.775	3.775	3.60-75	2.80
Sheets, H.R., Chicago	3.775	3.775	3.775	3.60	2.80
Sheets, C.R., Pittsburgh	4.575	4.575	4.575	4.35	3.55
Sheets, C.R., Chicago	4.575	4.575	4.575	4.35	3.55
Sheets, C.R., Detroit	4.775	4.775	4.775	4.55	3.70
Sheets, Galv., Pittsburgh	5.075	5.075	5.075	4.80	3.90
Strip, H.R., Pittsburgh	3.75-4.225	3.75-4.225	3.75-4.225	3.75-4.00	2.80
Strip, H.R., Chicago	3.725	3.725	3.725	3.50	2.80
Strip, C.R., Pittsburgh	5.10-5.80	5.10-5.80	5.10-5.80	4.85-5.35	3.55
Strip, C.R., Chicago	5.35	5.35	5.35	4.90	3.65
Strip, C.R., Detroit	5.30-6.05	5.30-6.05	5.30-6.05	4.85-5.60	3.70
Wire, Basic, Pittsburgh	5.10-5.225	5.10-5.225	5.10-5.225	4.85-5.10	3.675
Nails, Wire, Pittsburgh	6.20-6.35	6.20-6.35	6.20-6.35	5.90-6.20	4.625
Tin plate, box, Pittsburgh	$8.95	$8.95	$8.95	$8.70	$5.75

SEMIFINISHED					
Billets, forging, Pittsburgh (NT)	$70.50	$70.50	$70.50	$66.00	$56.50
Wire rods, No. 5, Pittsburgh	4.425	4.425	4.425	4.10-20	3.05

PIG IRON, Gross Ton					
Bessemer, Pittsburgh	$55.50	$55.50	$55.50	$53.00	$37.00
Basic, Valley	54.50	54.50	54.50	52.00	36.00
No. 2, del. Phila.	59.25	59.25	59.25	56.61	38.84
No. 2, Fdry., Pittsburgh	55.00	55.00	55.00	52.50	36.50
No. 2, Fdry., Chicago	55.00	55.00	55.00	52.50	36.00
No. 2, Fdry., Valley	55.00	55.00	55.00	52.50	36.50
No. 2, Fdry., del. Phila.	59.75	59.75	59.75	57.11	39.34
No. 2, Fdry., Birm.	51.38	51.38	51.38	48.88	34.88
No. 2, Fdry., Birm., del. Cin.	58.93	58.93	58.93	55.49	38.74
Malleable, Valley	55.00	55.00	55.00	52.50	36.50
Malleable, Chicago	55.00	55.00	55.00	52.50	36.50
Charcoal, Lyles, Tenn.	68.50	68.50	68.50	66.00	50.00
Ferromanganese, Etna, Pa.	228.00	228.00	228.00	188.00	151.00*

* Furn. rate, Pittsburgh.

SCRAP, Gross Ton (including broker's commission)					
No. 1 Heavy Melt., Pitts.	$44.00	$44.00	$44.00	$44.00	$40.00
No. 1 Heavy Melt., E. Pa.	41.50	41.50	41.50	42.50	42.50
No. 1 Heavy Melt., Chicago	42.50	42.50	42.50	42.50	38.75
No. 1 Heavy Melt., Valley	44.00	44.00	44.00	44.00	40.00
No. 1 Heavy Melt., Cleve.	43.00	43.00	43.00	43.00	40.00
No. 1 Heavy Melt., Buffalo	43.00	43.00	43.00	43.00	42.50
Rails, Nenzig, Chicago	52.50	52.50	52.50	52.50	35.50
No. 1 Cast, Chicago	50.00	50.00	50.00	49.00*	49.00

* F.o.b. shipping point.

COKE, Net Ton					
Beehive, Furn., Connlsvl.	$14.75	$14.75	$14.75	$14.75	$12.00-12.50
Beehive, Fdry., Connlsvl.	17.00	17.00	17.00	17.50	14.00-15.00
Oven, Fdry., Chicago	23.00	23.00	23.00	23.00	17.60

PIG IRON

F.o.b. furnace prices quoted under GCPR as reported to STEEL. Minimum delivered prices are approximate and do not include 3% federal tax. Key to producing companies published on second following page.

PIG IRON, Gross Ton	Base	No. 2 Foundry	Malleable	Bessemer
Bethlehem, Pa. B2	$56.50	$57.00	$57.50	$58.00
New York, del.		60.78	61.28	
Newark, del.	59.52	60.02	60.52	61.02
Philadelphia, del.	59.25	59.75	60.25	60.75
Birmingham District				
Alabama City, Ala., R2	50.88	51.38		
Birmingham, R2	50.88	51.38		
Birmingham, S9		51.38		
Woodward, Ala., W15	50.88	51.38		
Cincinnati, del.		58.93		
Buffalo District				
Buffalo, R2	54.50	55.00	55.50	
Buffalo, H1	54.50	55.00	55.50	
Tonawanda, N.Y., W12	54.50	55.00	55.50	
No. Tonawanda, N.Y., T9		55.00	55.50	
Boston, del.	65.15	65.65	66.15	
Rochester, N.Y., del.	57.62	58.02	58.52	
Syracuse, N.Y., del.	58.62	59.12	59.62	
Chicago District				
Chicago, I-3	54.50	55.00	55.00	55.50
Gary, Ind., U5	54.50		55.00	
Indiana Harbor, Ind., I-2	54.50		55.00	
So. Chicago, Ill., W14	54.50	55.00	55.00	
So. Chicago, Ill., Y1	54.50	55.00	55.00	
So. Chicago, Ill., U5	54.50		55.00	55.50
Milwaukee, del.	56.67	57.17	57.17	57.67
Muskegon, Mich., del.		61.30	61.30	
Cleveland District				
Cleveland, A7	54.50	55.00	55.00	55.50
Cleveland, R2	54.50	55.00	55.00	
Akron, O., del. from Cleve.	57.11	57.61	57.61	58.11
Lorain, O., N3	54.50			55.50
Duluth, I-3			55.00	
Erie, Pa., I-3	54.50	55.00	55.00	55.50
Everett, Mass., E1		59.25	59.75	
Fontana, Calif., K1	60.50	61.00		
Granite City, Ill., G4	56.40	56.90	57.40	
St. Louis, del. (inc. tax)	57.15	57.65	58.15	
Ironton, Utah, C11	54.50	55.00		
Geneva, Utah, C11	54.50	55.00		
LoneStar, Tex., L6	50.50	*51.00	51.00	
Minnequa, Colo., C10	56.50	57.50	57.50	
Rockwood, Tenn., T3			58.50	
Pittsburgh District				
Neville Island, Pa., P6		55.00	55.00	55.50
Pitts., N&S. sides, Ambridge, Aliquippa, del.		56.37	56.37	56.87
McKeesRocks, del.		56.04	56.04	56.54
Lawrenceville, Homestead, Wilmerding, Monaca, del.		56.66	56.66	57.16
Verona, Trafford, del.		57.19	57.19	57.69
Brackenridge, del.		57.45	57.45	57.95
Bessemer, Pa., U5	54.50		55.00	55.50
Clairton, Rankin, So. Duquesne, Pa., U5	54.50			
McKeesport, Pa., N3	54.50			55.50
Monessen, Pa., P7	56.50			
Sharpsville, Pa., S6			55.00	55.50
Steelton, Pa., B2	56.50	57.00	57.50	58.00
Swedeland, Pa., A3	58.50	59.00	59.50	60.00
Toledo, O., I-3	54.50	55.00	55.00	55.50
Cincinnati, del.	59.97	60.47		
Troy, N.Y., R2	56.50	57.00	57.50	58.00
Youngstown District				
Hubbard, O., Y1	54.50	55.00	55.00	
Youngstown, Y1	54.50	55.00	55.00	
Youngstown, U5	54.50			55.50
Mansfield, O., del.	59.15	59.65	59.65	60.15

* Low phos., southern grade.

PIG IRON DIFFERENTIAL

Silicon: Add 50 cents per ton for each 0.25% Si or percentage thereof over base grade, 1.75-2.25%, except on low phos iron on which base is 1.75-2.00%.

Phosphorus: Deduct 38 cents per ton for P content of 0.70% and over.

Manganese: Add 50 cents per ton for each 0.50% manganese over 1% or portion thereof.

Nickel: (Under 0.50% no extra) 0.50-0.74%, incl., add $2 per ton and each additional 0.25%, add $1 per ton.

BLAST FURNACE SILVERY PIG IRON, Gross Ton

(Base 6.0-6.50% silicon; add $1.50 for each 0.5% Si)

Jackson, O., G2, J1	$65.50
Buffalo, H1	66.75

ELECTRIC FURNACE SILVERY PIG IRON, Gross Ton

(Base 14.01-14.50% silicon; add $1 for each 0.5% Si to 18%; $1 for each 0.5% Mn over 1%; $2 per gross ton premium for 0.045% max. P.)

Niagara Falls, N.Y., P15	$91.00
Keokuk, Iowa, Openhearth & Fdry., frt. allowed K2	92.50
Keokuk, Iowa, OH & Fdry., 12½ lb. piglets, 16% Si, frt. allowed K2	95.50
Wenatchee, Wash., OH & Fdry., frt. allowed K2	92.50

CHARCOAL PIG IRON, Gross Ton

(Low phos semi-cold blast; differential charged for silicon over base grade; also for hard chilling iron Nos. 5 & 6.)

Lyles, Tenn., T3	$68.50

LOW PHOSPHORUS PIG IRON, Gross Ton

Cleveland, intermediate, A7	$59.50
Steelton, Pa., B2	62.50
Philadelphia, delivered	66.06
Troy, N.Y., R2	62.50

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Semifinished and Finished Steel Products

Mill prices quoted under CPR as reported to STEEL, Nov. 26, 1952, cents per pound except as otherwise noted. Changes shown in italics. Code numbers following mill points indicate producing company, key on next two pages.

INGOTS, Carbon, Forging (NT)
Fontana, Calif. K1 ... $81.00
Munhall, Pa. U5 ... 54.00
Seattle 824 ... 75.00

INGOTS, Alloy (NT)
Detroit R7 ... $57.00
Fontana, Calif. K1 ... 83.00
Houston S5 ... 65.00
Midland, Pa. C18 ... 57.00
Munhall, Pa. U5 ... 57.00

BILLETS, BLOOMS & SLABS
Carbon, Rerolling (NT)
Bessemer, Pa. U5 ... $59.00
Clairton, Pa. U5 ... 59.00
Ensley, Ala. T2 ... 59.00
Fairfield, Ala. T2 ... 59.00
Fontana, Calif. K1 ... 78.00
Gary, Ind. U5 ... 59.00
Johnstown, Pa. B2 ... 59.00
Lackawanna, N.Y. B2 ... 59.00
Munhall, Pa. U5 ... 59.00
So. Chicago, Ill. U5 ... 59.00
So. Duquesne, Pa. U5 ... 59.00

Carbon, Forging (NT)
Bessemer, Pa. U5 ... $70.50
Buffalo R2 ... 70.50
Canton, O. R2 ... 70.50
Clairton, Pa. U5 ... 70.50
Cleveland R2 ... 77.50
Conshohocken, Pa. A3 ... 77.50
Detroit R7 ... 73.50
Ensley, Ala. T2 ... 70.50
Fairfield, Ala. T2 ... 70.50
Fontana, Calif. K1 ... 89.50
Gary, Ind. U5 ... 70.50
Geneva, Utah C11 ... 70.50
Houston S5 ... 78.50
Johnstown, Pa. B2 ... 70.50
Lackawanna, N.Y. B2 ... 70.50
Los Angeles B3 ... 89.50
Munhall, Pa. U5 ... 70.50
Seattle B3 ... 89.50
So. Chicago, Ill. U5, W14 ... 70.50
So. Duquesne, Pa. U5 ... 70.50
So. San Francisco B3 ... 89.50

Alloy, Forging (NT)
Bethlehem, Pa. B2 ... $76.00
Buffalo R2 ... 76.00
Canton, O. R2 ... 76.00
Canton, O. T7 ... 78.60
Conshohocken, Pa. A3 ... 83.00
Detroit R7 ... 76.00
Fontana, Calif. K1 ... 95.00
Gary, Ind. U5 ... 76.00
Houston S5 ... 84.00
Ind. Harbor, Ind. Y1 ... 76.00
Johnstown, Pa. B2 ... 76.00
Lackawanna, N.Y. B2 ... 76.00
Los Angeles B3 ... 96.00
Massillon, O. R2 ... 76.00
Midland, Pa. C18 ... 76.00
Munhall, Pa. U5 ... 76.00
So. Chicago, R2, U5, W14 ... 76.00
So. Duquesne, Pa. U5 ... 76.00
Struthers, O. Y1 ... 76.00
Warren, O. C17 ... 76.00

ROUNDS, SEAMLESS TUBE (NT)
Buffalo R2 ... $87.50
Canton, O. R2 ... 87.50
Cleveland R2 ... 87.50
Fontana, Calif. K1 ... 106.50
Gary, Ind. U5 ... 87.50
Massillon, O. R2 ... 87.50
So. Chicago, Ill. R2 ... 87.50
So. Duquesne, Pa. U5 ... 87.50

SHEET BARS (NT)
Fontana, Calif. K1(43) ... $89.00

SKELP
Aliquippa, Pa. J5 ... $3.65
Munhall, Pa. U5 ... 3.55
Warren, O. R2 ... 3.55
Youngstown R2, U5 ... 3.55

WIRE RODS
Alton, Ill. L1 ... 4.70
Alabama City, Ala. R2 ... 4.325
Buffalo W12 ... 4.325
Cleveland A7 ... 4.325
Donora, Pa. A7 ... 4.325
Fairfield, Ala. T2 ... 4.325
Fontana, Calif. K1 ... 5.125
Houston S5 ... 4.725
Johnstown, Pa. B2 ... 4.325
Joliet, Ill. A7 ... 4.325
Kansas City, Mo. S5 ... 4.665
Los Angeles B3 ... 5.125
Minnequa, Colo. C10 ... 4.575
Monessen, Pa. P7 ... 4.525
No. Tonawanda, N.Y. B11 ... 4.575
Pittsburg, Calif. C11 ... 4.975
Portsmouth, O. P12 ... 4.525
Roebling, N.J. R5 ... 4.425
So. Chicago, Ill. R2 ... 4.325
Sparrows Point, Md. B2 ... 4.425
Sterling, Ill. (1) N15 ... 4.325
Struthers, O. Y1 ... 4.325
Torrance, Calif. C11 ... 5.125
Worcester, Mass. A7 ... 4.625

SHEET STEEL PILING
Ind. Harbor, Ind. I-2 ... 4.675
Lackawanna, N.Y. B2 ... 4.675
Munhall, Pa. U5 ... 4.675
So. Chicago, Ill. U5 ... 4.675

STRUCTURALS
Carbon Steel Stand. Shapes
Alabama City, Ala. R2 ... 3.85
Aliquippa, Pa. J5 ... 3.85
Bessemer, Ala. T2 ... 3.85
Bethlehem, Pa. B2 ... 3.90
Clairton, Pa. U5 ... 3.85
Fairfield, Ala. T2 ... 3.85
Fontana, Calif. K1 ... 4.45
Gary, Ind. U5 ... 3.85
Geneva, Utah C11 ... 3.85
Houston S5 ... 4.25
Ind. Harbor, Ind. I-2 ... 3.85
Johnstown, Pa. B2 ... 3.90
Kansas City, Mo. S5 ... 4.10
Lackawanna, N.Y. B2 ... 3.90
Los Angeles B3 ... 4.45
Minnequa, Colo. C10 ... 4.30
Munhall, Pa. U5 ... 3.85
Niles, Calif. (22) P1 ... 4.50
Phoenixville, Pa. P4 ... 4.10
Seattle B3 ... 4.50
So. Chicago, Ill. U5, W14 ... 3.85
So. San Francisco B3 ... 4.40
Torrance, Calif. C11 ... 4.45
Weirton, W.Va. W6 ... 4.10

Wide Flange
Bethlehem, Pa. B2 ... 3.90
Clairton, Pa. U5 ... 3.85
Fontana, Calif. K1 ... 4.85
Johnstown, Pa. B2 ... 3.90
Lackawanna, N.Y. B2 ... 3.90
Munhall, Pa. U5 ... 3.85
So. Chicago, Ill. U5 ... 3.85

Alloy Stand. Shapes
Clairton, Pa. U5 ... 4.725
Fontana, Calif. K1 ... 5.925
Gary, Ind. U5 ... 4.725
Munhall, Pa. U5 ... 4.725
So. Chicago, Ill. U5 ... 4.725

H.S., L.A. Stand. Shapes
Aliquippa, Pa. J5 ... 5.80
Bessemer, Ala. T2 ... 5.80
Bethlehem, Pa. B2 ... 5.80
Clairton, Pa. U5 ... 5.80
Fairfield, Ala. T2 ... 5.80
Fontana, Calif. K1 ... 6.40
Gary, Ind. U5 ... 5.80
Geneva, Utah C11 ... 5.80
Ind. Harbor, Ind. I-2 ... 5.80
Ind. Harbor, Ind. Y1 ... 6.30
Johnstown, Pa. B2 ... 5.80
Lackawanna, N.Y. B2 ... 5.80
Los Angeles B3 ... 6.35
Munhall, Pa. U5 ... 5.80
Seattle B3 ... 6.40
So. Chicago, Ill. U5 ... 5.80
So. San Francisco B3 ... 6.30
Struthers, O. Y1 ... 6.30

H.S., L.A. Wide Flange
Aliquippa, Pa. J5 ... 5.50
Bethlehem, Pa. B2 ... 5.95
Lackawanna, N.Y. B2 ... 5.80
Munhall, Pa. U5 ... 5.75
So. Chicago, Ill. U5 ... 5.75

BEARING PILES
Munhall, Pa. U5 ... 3.85
So. Chicago, Ill. U5 ... 3.85

PLATES, High-Strength Low-Alloy
Aliquippa, Pa. J5 ... 5.95
Bessemer, Ala. T2 ... 5.95
Clairton, Pa. U5 ... 5.95
Cleveland J5, R2 ... 5.95
Conshohocken, Pa. A3 ... 6.20
Ecorse, Mich. G5 ... 6.90
Fairfield, Ala. T2 ... 5.95
Fontana, Calif. (30) K1 ... 6.55
Gary, Ind. U5 ... 5.95
Geneva, Utah C11 ... 5.95
Ind. Harbor, Ind. I-2 ... 5.95
Ind. Harbor, Ind. Y1 ... 6.45
Johnstown, Pa. B2 ... 5.95
Munhall, Pa. U5 ... 5.95
Pittsburgh J5 ... 5.95
Seattle B3 ... 6.85
Sharon, Pa. S3 ... 5.95
So. Chicago, Ill. U5 ... 5.95
Sparrows Point, Md. B2 ... 5.95
Warren, O. R2 ... 5.95
Youngstown Y1 ... 6.45
Youngstown U5 ... 5.95

PLATES, Open-Hearth Alloy
Claymont, Del. C22 ... 5.35
Coatesville, Pa. L7 ... 5.75
Conshohocken, Pa. A3 ... 5.55
Fontana, Calif. K1 ... 6.20
Houston S5 ... 5.25
Johnstown, Pa. B2 ... 5.25
Munhall, Pa. U5 ... 5.25
Sharon, Pa. S3 ... 5.70
So. Chicago, Ill. U5 ... 5.25
Sparrows Point, Md. B2 ... 5.25

FLOOR PLATES
Cleveland J5 ... 4.95
Conshohocken, Pa. A3 ... 4.95
Ind. Harbor, Ind. I-2 ... 4.95
Munhall, Pa. U5 ... 4.95
So. Chicago, Ill. U5 ... 4.95

PLATES, Ingot Iron
Ashland, (.1 (15), A10 ... 4.15
Cleveland (.1 R2 ... 4.50
Warren, O. (.1 R2 ... 4.50

PLATES, Carbon Steel
Alabama City, Ala. R2 ... 3.90
Aliquippa, Pa. J5 ... 3.90
Ashland, Ky. (15) A10 ... 3.90
Bessemer, Ala. T2 ... 3.90
Clairton, Pa. U5 ... 3.90
Claymont, Del. C22 ... 4.35
Cleveland J5, R2 ... 3.90
Coatesville, Pa. L7 ... 4.35
Conshohocken, Pa. A3 ... 4.30
Ecorse, Mich. G5 ... 4.45
Fairfield, Ala. T2 ... 3.90
Fontana, Calif. (30) K1 ... 4.50
Gary, Ind. U5 ... 3.90
Granite City, Ill. G4 ... 4.60
Geneva, Utah C11 ... 3.90
Harrisburg, Pa. C5 ... 6.50
Houston S5 ... 4.30
Ind. Harbor, Ind. I-2, Y1 ... 3.90
Johnstown, Pa. B2 ... 3.90
Lackawanna, N.Y. B2 ... 3.90
Minnequa, Colo. C10 ... 4.70
Munhall, Pa. U5 ... 3.90
Pittsburgh J5 ... 3.90
Seattle B3 ... 4.80
Sharon, Pa. S3 ... 4.15
So. Chicago, Ill. U5, W14 ... 3.90
Sparrows Point, Md. B2 ... 3.90
Steubenville, O. W10 ... 3.90
Warren, O. R2 ... 3.90
Weirton, W.Va. W6 ... 4.20
Youngstown R2, U5, Y1 ... 3.90

PLATES, Carbon A.R.
Fontana, Calif. K1 ... 5.65
Geneva, Utah C11 ... 5.05

PLATES, Wrought Iron
(Add 4.7% to base and extras)
Economy, Pa. B14 ... 8.60

BARS, Hot-Rolled Carbon
Alabama City, Ala. R2 ... 3.95
Aliquippa, Pa. J5 ... 3.95
Alton, Ill. L1 ... 4.50
Atlanta, Ga. A11 ... 4.50
Bessemer, Ala. T2 ... 3.95
Buffalo R2 ... 3.95
Canton, O. R2 ... 3.95
Clairton, Pa. U5 ... 3.95
Cleveland R2 ... 3.95
Detroit R7 ... 4.10
Ecorse, Mich. G5 ... 4.30
Emeryville, Calif. J7 ... 4.70
Fairfield, Ala. T2 ... 3.95
Fontana, Calif. K1 ... 4.65
Gary, Ind. U5 ... 3.95
Houston S5 ... 4.35
Ind. Harbor, Ind. I-2, Y1 ... 3.95
Johnstown, Pa. B2 ... 3.95
Kansas City, Mo. S5 ... 4.55
Lackawanna, N.Y. B2 ... 3.95
Los Angeles B3 ... 4.65
Milton, Pa. B6 ... 4.55
Minnequa, Colo. C10 ... 4.40
Niles, Calif. P1 ... 4.65
N. Tonawanda, N.Y. B11 ... 3.95
Pittsburg, Calif. C11 ... 4.65
Pittsburgh J5 ... 3.95
Seattle B3, N14 ... 4.70
So. Chicago R2, U5, W14 ... 3.95
So. Duquesne, Pa. U5 ... 3.95
So. San Fran., Cal. B3 ... 4.70
Sterling, Ill. N15 ... 4.55
Struthers, O. Y1 ... 3.95
Torrance, Calif. C11 ... 4.65
Weirton, W.Va. W6 ... 4.20
Youngstown R2, U5 ... 3.95

BAR SIZE ANGLES, S Shapes
Aliquippa, Pa. J5 ... 3.95
Atlanta A11 ... 4.50
Niles, Calif. P1 ... 4.65
San Francisco B7 ... 5.00

BAR SIZE ANGLES; H.R CARBON
Bethlehem, Pa. B2 ... 4.15

BARS, Hot-Rolled Alloy
Bethlehem, Pa. B2 ... 4.675
Buffalo R2 ... 4.675
Canton, O. R2 ... 4.675
Canton, O. T7 ... 4.72
Clairton, Pa. U5 ... 4.675
Detroit R7 ... 4.825
Ecorse, Mich. G5 ... 5.025
Fontana, Calif. K1 ... 5.725
Gary, Ind. U5 ... 4.675
Houston S5 ... 5.075
Ind. Harbor, Ind. I-2, Y1 ... 4.675
Johnstown, Pa. B2 ... 4.675
Kansas City, Mo. S5 ... 5.275
Lackawanna, N.Y. B2 ... 4.675
Los Angeles B3 ... 5.725
Massillon, O. R2 ... 4.675
Midland, Pa. C18 ... 4.30
So. Chicago R2, U5, W14 ... 4.675
So. Duquesne, Pa. U5 ... 4.675
Struthers, O. Y1 ... 4.675
Warren, O. C17 ... 4.675
Youngstown U5 ... 4.675

BAR SHAPES, Hot-Rolled Alloy
Clairton, Pa. U5 ... 4.925
Gary, Ind. U5 ... 4.925
Youngstown U5 ... 4.925

BARS & SMALL SHAPES, H.R.
High-Strength Low-Alloy
Aliquippa, Pa. J5 ... 5.925
Bessemer, Ala. T2 ... 5.925
Bethlehem, Pa. B2 ... 5.925
Clairton, Pa. U5 ... 5.925
Cleveland R2 ... 5.925
Ecorse, Mich. G5 ... 6.675
Fontana, Calif. K1 ... 6.975
Gary, Ind. U5 ... 5.925
Ind. Harbor, Ind. I-2 ... 5.925
Indiana Harbor, Ind. Y1 ... 6.425
Johnstown, Pa. B2 ... 5.925
Lackawanna, N.Y. B2 ... 5.925
Los Angeles B3 ... 6.625
Pittsburgh J5 ... 5.925
Seattle B3 ... 6.675
So. Duquesne, Pa. U5 ... 5.925
So. San Francisco B3 ... 6.675
Struthers, O. Y1 ... 6.425
Youngstown U5 ... 5.925

BARS, Cold-Finished Carbon
Ambridge, Pa. W18 ... 6.925
Beaver Falls, Pa. R2 ... 6.925
Beaver Falls, Pa. M12 ... 6.925
Buffalo B5 ... 6.975
Camden, N.J. P13 ... 6.375
Carnegie, Pa. C12 ... 6.925
Chicago B5 ... 6.925
Chicago W18 ... 6.925
Cleveland A7, C20 ... 6.925
Detroit P17, R7 ... 6.075
Donora, Pa. A7 ... 6.925
Elyria, O. W8 ... 6.925
Franklin Park, Ill. N5 ... 6.925
Gary, Ind. R2 ... 6.925
Green Bay, Wis. F7 ... 6.925
Hammond, Ind. L2, M13 ... 6.925
Hartford, Conn. R2 ... 6.475
Los Angeles R2 ... 6.375
Mansfield, Mass. B5 ... 6.475
Massillon, O. R2, R8 ... 6.925
Monaca, Pa. S17 ... 6.925
Newark, N.J., W18 ... 6.375
Plymouth, Mich. P5 ... 6.175
Pittsburgh J5 ... 6.925
Putnam, Conn. W18 ... 6.475
Readville, Mass. C14 ... 6.475
St. Louis, Mo. M5 ... 6.30
So. Chicago, Ill. W14 ... 6.925
Springfield, Pa. K3 ... 6.375
Struthers, O. Y1 ... 6.925
Waukegan, Ill. A7 ... 6.925
Youngstown Y1 ... 6.925
Youngstown F3 ... 6.925

BARS, Cold-Finished Alloy
Ambridge, Pa. W18 ... 6.00
Beaver Falls, Pa. M12 ... 6.00
Bethlehem, Pa. B2 ... 6.00
Buffalo B5 ... 6.00
Camden, N.J. P13 ... 6.40
Canton, O. R2 ... 6.00
Canton, O. T7 ... 5.99
Carnegie, Pa. C12 ... 6.00
Chicago B5 ... 6.00
Chicago W18 ... 6.00
Cleveland A7 ... 6.05
Cleveland C20 ... 6.00
Detroit P17, R7 ... 6.15
Donora, Pa. A7 ... 6.05
Elyria, O. W8 ... 6.00
Gary, Ind. R2 ... 6.00
Hammond, Ind. L2, M13 ... 6.00
Hartford, Conn. R2 ... 6.45
Lackawanna, N.Y. B2 ... 6.00
Mansfield, Mass. B5 ... 6.45
Massillon, O. R2, R8 ... 6.00
Midland, Pa. C18 ... 5.40
Monaca, Pa. S17 ... 6.00
Newark, N.J. W18 ... 6.35
Plymouth, Mich. P5 ... 6.20
So. Chicago, Ill. R2, W14 ... 6.00
Springfield, Pa. K3 ... 6.20
Struthers, O. Y1 ... 6.00
Warren, O. C17 ... 6.00
Waukegan, Ill. A7 ... 6.05
Worcester, Mass. A7 ... 6.35
Youngstown Y1 ... 6.00
Youngstown F3 ... 6.00

BARS, Reinforcing (Fabricators)
Alabama City, Ala. R2 ... 3.95
Atlanta A11 ... 4.50
Buffalo R2 ... 3.95
Cleveland R2 ... 3.95
Emeryville, Calif. J7 ... 4.70
Fairfield, Ala. T2 ... 3.95
Fontana, Calif. K1 ... 4.65
Gary, Ind. U5 ... 3.95
Houston S5 ... 4.35
Ind. Harbor, Ind. I-2, Y1 ... 3.95
Johnstown, Pa. B2 ... 3.95
Kansas City, Mo. S5 ... 4.55
Lackawanna, N.Y. B2 ... 3.95
Los Angeles B3 ... 4.65
Milton, Pa. B6 ... 4.55
Minnequa, Colo. C10 ... 4.75
Niles, Calif. P1 ... 4.65
Pittsburg, Calif. C11 ... 4.65
Pittsburgh J5 ... 3.95
Sand Springs, Okla. S8 ... 4.85
Seattle B3, N14 ... 4.70
So. Chicago, Ill. R2 ... 3.95
So. Duquesne, Pa. U5 ... 3.95
So. San Francisco B3 ... 4.70
Sparrows Point, Md. B2 ... 3.95
Sterling, Ill. (1) N15 ... 4.70
Struthers, O. Y1 ... 3.95
Torrance, Calif. C11 ... 4.65
Youngstown R2, U5 ... 3.95

BARS, Reinforcing (Mills)
(Fabricated to consumers)
Huntington, W.Va. W7 ... 5.50
Johnstown, ½-1" B2 ... 4.75
Los Angeles B3 ... 5.45
Marion, O. P11 ... 4.75
Seattle B3, N14 ... 4.80
So. San Francisco B3 ... 5.45
Sparrows Pt., ½-1" B2 ... 4.75
Williamsport, Pa. S19 ... 5.35

RAIL STEEL BARS
Chicago Hts. (3.4) C2 ... 5.00
Chicago Hts. (3.4) F3 ... 4.75
Emeryville, (3.4) F3 ... 5.00
Fort Worth, Tex. (26) T4 ... 5.10
Huntington, W.Va. (3) W7 ... 5.75
Marion, O. (3) P11 ... 4.75
Moline, Ill. (3) R2 ... 4.05
Tonawanda (3.4) B12 ... 5.00
Williamsport (3) S19 ... 5.25
Williamsport (3.4) S19 ... 5.35

BARS, Wrought Iron
(Add 4.7% to base and extras)
Economy, Pa. (8 R.) B14 ... 9.60
Economy, Pa. (6 R.) B14 ... 11.90
Economy (Staybolt) B14 ... 12.20
Mc K Rks (8 R.) L5 ... 8.50
Mc K Rks (6 R.) L5 ... 9.60
Mc K Rks (D.R.) L5 ... 13.00

SHEETS, Hot-Rolled Steel
(18 gage and heavier)
Alabama City, Ala. R2 ... 3.775
Ashland, Ky. (8) A10 ... 3.775
Butler, Pa. A10 ... 3.775
Cleveland J5, R2 ... 3.775
Conshohocken, Pa. A3 ... 4.175
Detroit M1 ... 4.40
Ecorse, Mich. G5 ... 3.975
Fairfield, Ala. T2 ... 3.775
Fontana, Calif. K1 ... 4.725
Gary, Ind. U5 ... 3.775
Geneva, Utah C11 ... 3.875
Granite City, Ill. G4 ... 4.20
Ind. Harbor, Ind. I-2, Y1 ... 3.775
Irvin, Pa. U5 ... 3.775
Lackawanna, N.Y. B2 ... 3.775
Munhall, Pa. U5 ... 3.775
Niles, O. N12 ... 3.775
Pittsburg, Calif. C11 ... 4.475
Pittsburgh J5 ... 3.775
Sharon, Pa. S3 ... 4.175
So. Chicago, Ill. W14 ... 3.775
Sparrows Point, Md. B2 ... 3.775
Steubenville, O. W10 ... 3.775
Torrance, Calif. C11 ... 4.475
Warren, O. R2 ... 3.775
Weirton, W.Va. W6 ... 3.775
West Leechburg, Pa. A4 ... 3.925
Youngstown U5, Y1 ... 3.775
(.2 to .119 gage)
Alabama City, Ala. R2 ... 4.925
Dover, O. R1 ... 5.825
Mansfield, O. E6 ... 5.65
Niles, O. N12 ... 4.675
Torrance, Calif. C11 ... 5.575

SHEETS, H.R. (14 gage, heavier)
High-Strength Low-Alloy
Cleveland J5, R2 ... 5.675
Conshohocken, Pa. A3 ... 5.925
Monaca, Pa. S17 ... 6.225
Fairfield, Ala. T2 ... 5.675
Fontana, Calif. K1 ... 6.625
Gary, Ind. U5 ... 5.675
Ind. Harbor, Ind. I-2 ... 5.675
Ind. Harbor, Ind. Y1 ... 6.175
Irvin, Pa. U5 ... 5.675
Lackawanna (35) B2 ... 5.675
Munhall, U5 ... 5.675
Pittsburgh J5 ... 5.675
Sharon, Pa. S3 ... 5.675
So. Chicago, Ill. U5 ... 5.675
Sparrows Point (36) B2 ... 5.675
Warren, O. R2 ... 5.675
Weirton, W.Va. W6 ... 6.025
Youngstown U5 ... 5.675
Youngstown Y1 ... 6.175

SHEETS, Cold-Rolled
High-Strength Low-Alloy
Cleveland J5, R2 ... 6.925
Ecorse, Mich. G5 ... 7.475
Fontana, Calif. K1 ... 7.875
Gary, Ind. U5 ... 6.925
Indiana Harbor, Ind. Y1 ... 7.425
Indiana Harbor, Ind. I-2 ... 6.925
Irvin, Pa. U5 ... 6.925
Lackawanna (37) B2 ... 6.925
Pittsburgh J5 ... 6.925
Sparrows Point (38) B2 ... 6.925
Warren, O. R2 ... 6.925
Weirton, W.Va. W6 ... 7.275
Youngstown Y1 ... 7.425

SHEETS, Cold-Rolled Steel (Commercial Quality)

Butler, Pa. A10	4.525
Cleveland, O. B2	4.525
Ecorse, Mich. G5	4.625
Fairfield, Ala. T2	4.525
Follansbee, W.Va. F4	4.525
Fontana, Calif. K1	4.525
Gary, Ind. U5	4.525
Granite City, Ill. G4	4.525
Ind. Harbor, Ind. I-2, Y1	4.525
Irvin, Pa. U5	4.525
Lackawanna, N.Y. B2	4.525
Middletown, O. A10	4.525
Pittsburg, Calif. C11	4.525
Sparrows Point, Md. B2	4.525
Steubenville, O. W10	4.525
Warren, O. R2	4.525
Weirton, W.Va. W6	4.525
Weirton, W.Va. W6, Follansbee, W.Va. F4	4.525
Youngstown, O. Y1	4.525

SHEETS, Galv'd No. 10 Steel

Ashland, Ky. Ala. B2	5.075
Ashland, Ky. (8) A10	5.075
Canton, O. B2	5.075
Dayton, O. N16	5.625
Dover, O. B1	5.775
Fairfield, Ala. T2	5.075
Gary, Ind. U5	5.075
Granite City, Ill. G4	5.50
Ind. Harbor, Ind. I-2	5.075
Irvin, Pa. U5	5.075
Kokomo, Ind. (13), C16	5.475
Martins Ferry, O. W10	5.075
Niles, O. N12	5.275
Pittsburg, Calif. C11	5.825
Sparrows Point, Md. B2	5.075
Steubenville, O. W10	5.075
Torrance, Calif. C11	5.825
Weirton, W.Va. W6	5.075

SHEETS, Galvanized No. 10, High Strength Low-Alloy

Irvin, Pa. U5	7.625
Sparrows Point (39), B2	7.775

SHEETS, Galvannealed Steel

Canton, O. B2	5.625
Irvin, Pa. U5	5.625
Kokomo, Ind. (13), C16	6.025
Niles, O. N12	5.825
Weirton, W.Va. W6	5.775

SHEETS, ZINCGRIP Steel No. 10

Butler, Pa. A10	5.325
Middletown, O. A10	5.325

SHEETS, Electro Galvanized

Cleveland, R2 (28)	5.925
Niles, O. R2 (28)	5.925
Weirton, W.Va. W6	5.775

SHEETS, Well Casing

Fontana, Calif. K1 (4)	5.10
Torrance, Calif. C11	5.275

BLUED Stock, 29 ga

Yorkville, O. W10	7.00
Follansbee, W.Va. F4	7.10
Steubenville (23), F4	6.425

SHEETS, Enameling Iron

Ashland, Ky. (8) A10	4.925
Cleveland, R2	4.925
Gary, Ind. U5	4.925
Granite City, Ill. G4	5.025
Ind. Harbor, Ind. I-2	4.925
Irvin, Pa. U5	4.925
Middletown, O. A10	4.925
Youngstown, Y1	4.925

TIN PLATE, Electrolytic (Base Plate)

	0.25 lb	0.50 lb	0.75 lb
Aliquippa, Pa. J5	$7.40	$7.65	$8.05
Fairfield, Ala. T2	7.50	7.75	8.15
Gary, Ind. U5	7.40	7.65	8.05
Granite City, Ill. G4	7.60	7.85	8.25
Ind. Harbor, Ind. I-2, Y1	7.40	7.65	8.05
Irvin, Pa. U5	7.40	7.65	8.05
Niles, O. R2	7.40		
Pittsburg, Calif. C11	7.85	8.40	8.80
Sparrows Point, Md. B2	7.50	7.75	8.15
Weirton, W.Va. W6	7.40	7.65	8.05
Yorkville, O. W10	7.40	7.65	8.05

SHEETS, SILICON, H.R. or C.R. COILS (Cut lengths 72" & lower)

	Grade	Field	Arma-ture	Elec-tric	Motor	Dyna-mo
Beech Bottom, W.Va. W10 (cut lengths)		7.85	9.10	9.90		
Brackenridge, Pa. A3		7.85	9.60	10.40		
Granite City, Ill. G4 (cut lengths)		8.25	8.80			
Ind. Harbor, Ind. I-2		7.85	9.45	9.45		
Mansfield, O. E6 (cut lengths)		7.20	7.85	9.10	9.90	
Niles, O. N12 (cut lengths)		7.00	7.85	8.55		
Vandergrift, Pa. U5		7.85	8.55	9.60	10.40	
Warren, O. R2		7.85	8.55	9.60	10.40	
Zanesville, O. A10		7.85	8.55	9.60	10.40	

SHEETS, SILICON (22 Ga. Base) COILS (Cut Length 72" & lower)

Transformer Grade	72	65	58	52
Beech Bottom, W.Va. (cut lengths)	11.45	11.00	11.70	12.50
Brackenridge, Pa. A3	10.95			
Vandergrift, Pa. U5	10.95	11.50	12.20	13.00
Warren, O. R2	10.95			
Zanesville, O. A10	10.95	11.50	12.20	13.00

H.R. or C.R. COILS AND CUT LENGTHS, SILICON (22 Ga.)

	T-100	T-90	T-80	T-73
Butler, Pa. A10, C11			15.55	15.85
Vandergrift, Pa. U5	13.50	14.35	15.35	15.85

BLACK PLATE (Base Box)

Aliquippa, Pa. J5	$6.25
Fairfield, Ala. T2	6.60
Gary, Ind. U5	6.50
Granite City, Ill. G4	6.50
Ind. Harbor, Ind. I-2, Y1	6.50
Irvin, Pa. U5	6.50
Niles, O. R2	6.50
Weirton, W.Va. W6	6.50
Yorkville, O. W10	6.50

HOLLOWARE ENAMELING Black Plate (29 gage)

Follansbee, W.Va. F4	6.10
Irvin, Pa. U5	6.10
Granite City, Ill. G4	6.30
Ind. Harbor, Ind. Y1	6.10
Irvin, Pa. U5	6.10
Yorkville, O. W10	6.35

SHEETS, Culvert No. 16

	Cu	Cu
	Alloy	Fe
Ashland, Ky. A10	5.875	
Canton, O. B2	5.925	6.375
Fairfield, Ala. T2	5.875	6.125
Gary, Ind. U5	5.875	6.125
Ind. Harbor, Ind. I-2	5.875	6.125
Irvin, Pa. U5	5.875	6.125
Kokomo, Ind. C16	6.525	
Martins Ferry, O. W10	5.875	
Pittsburg, Calif. C11	6.625	
Sparrows Pt., Md. B2	5.875	6.125
Torrance, Calif. C11	6.625	

SHEETS, Culvert, No. 16 Pure Iron

Ashland, Ky. A10	6.125
Fairfield, Ala. T2	6.125
Martins Ferry, O. W10	6.125

SHEETS, Hot-Rolled Ingot Iron 18 Gage and Heavier

Ashland, Ky. (8) A10	4.025
Cleveland, R2	4.375
Ind. Harbor, Ind. I-2	4.025
Warren, O. R2	4.375

SHEETS, Cold-Rolled Ingot Iron

Butler, Pa. A10	5.025
Cleveland, R2	5.175
Middletown, O. A10	5.025
Warren, O. R2	5.175

SHEETS, Galvanized Ingot Iron No. 10 flat

Ashland, Ky. (8) A10	5.325
Canton, O. B2	5.525

SHEETS, ZINCGRIP Ingot Iron

Butler, Pa. A10	5.575
Middletown, O. A10	5.575

SHEETS, ALUMINIZED

Butler, Pa. A10	8.425

TINPLATE, American 1.25 Lb Coke (Base Box)

	lb	lb
Aliquippa, Pa. J5	$8.70	$8.95
Fairfield, Ala. T2	8.80	9.05
Gary, Ind. U5	8.70	8.95
Granite City, Ill. G4	8.70	8.95
Ind. Harbor, Ind. I-2, Y1	8.70	8.95
Irvin, Pa. U5	8.70	8.95
Pittsburg, Calif. C11	9.45	9.70
Sparrows Pt., Md. B2	8.80	9.05
Warren, O. R2	8.70	
Weirton, W.Va. W6	8.70	8.95
Yorkville, O. W10	8.70	8.95

MANUFACTURING TERNES (Special Coated)

Fairfield, Ala. T2	$7.85
Gary, Ind. U5	7.75
Irvin, Pa. U5	7.75
Yorkville, O. W10	7.75

SHEETS, LT. Coated Ternes, 6 lb

Yorkville, O. W10	$8.65

SHEETS, Mfg. Ternes, 8 lb (Commercial Quality)

Gary, Ind. U5	$9.75
Yorkville, O. W10	9.75

SHEET, Long Terne Steel (Commercial Quality)

Beech Bottom, W.Va. W10	5.475
Gary, Ind. U5	5.475
Mansfield, O. E6	6.05
Middletown, O. A10	5.475
Niles, O. N12	6.275
Weirton, W.Va. W6	5.475

SHEETS, Long Terne, Ingot Iron

Middletown, O. A10	5.575

ROOFING SHORT TERNES (8 lb Coated)

Gary, Ind. U5	9.75

STRIP, Hot-Rolled High-Strength Low-Alloy

Beech Bottom, W.Va.	5.65
Conshohocken, Pa. A3	5.90
Ecorse, Mich. G5	6.30
Fairfield, Ala. T2	5.65
Fontana, Calif. K1	6.55
Gary, Ind. U5	5.65
Ind. Harbor, Ind. I-2	5.65
Ind. Harbor, Ind. Y1	6.15
Lackawanna, N.Y. B2	5.70
Los Angeles (25), B3	6.40
Seattle (25), B3	6.65
Sharon, Pa. S3	5.65
So. San Francisco (25), B3	6.40
Sparrows Point, Md. B2	5.70
Warren, O. R2	5.65
Weirton, W.Va. W6	6.10
Youngstown, Y1	6.15
Youngstown, U5	5.65

STRIP, Cold-Rolled High-Strength Low-Alloy

Cleveland, O.	7.45
Cleveland, A7	7.30
Dover, O. G6	8.00
Ecorse, Mich. G5	8.15
Lackawanna, N.Y. B2	7.90
Sharon, Pa. S3	7.30
Sparrows Point, Md. B2	7.90
Warren, O. R2	7.30
Weirton, W.Va. W6	7.95
Youngstown, Y1	7.80

STRIP, Hot-Rolled Carbon

Ala. City, Ala. (27) R2	3.725
Alton, Ill. L1	4.20
Ashland, Ky. (8) A10	3.725
Atlanta, A11	4.275
Bessemer, Ala. T2	3.725
Bridgeport, Conn. (10) S15	4.225
Buffalo (27), R2	3.725
Butler, Pa. A10	3.725
Carnegie, Pa. S18	4.225
Conshohocken, Pa. A3	4.125
Detroit, M1	4.40
Ecorse, Mich. G5	4.025
Fairfield, Ala. T2	3.725
Fontana, Calif. K1	4.975
Gary, Ind. U5	3.725
Houston, Tex. S5	4.125
Ind. Harbor, Ind. I-2, Y1	3.725
Johnstown, Pa. (25) B2	3.725
Kansas City, Mo. (9) S5	4.025
Lackawanna, N.Y. (32) B2	3.725
Los Angeles (25), B3	4.475
Milton, Pa. R6	4.35
Minnequa, Colo. C10	4.775
New Britain (10) S15	4.225
N. Tonawanda, N.Y. B11	3.725
Pittsburg, Calif. C11	4.475
Riverdale, Ill. A7	3.725
San Francisco, B7	5.00
Seattle (25), B3	4.725
Seattle, N14	4.75
Sharon, Pa. S3	4.225
So. Chicago, Ill. W14	3.725
So. San Francisco (25), B3	4.475
Sparrows Point, Md. B2	3.725
Sterling, Ill. N14	4.725
Torrance, Calif. C11	4.475
Warren, O. R2	3.725
Weirton, W.Va. W6	3.825
West Leechburg, Pa. A4	3.975
Youngstown, U5, Y1	3.725

STRIP, Hot-Rolled Alloy

Bridgeport, Conn. (10) S15	6.65
Carnegie, Pa. S18	6.45
Fontana, Calif. K1	7.30
Gary, Ind. U5	6.10
Houston, Tex. S5	6.50
Kansas City, Mo. S5	6.70
Midland, Pa. C18	5.85
New Britn. Conn. (10), S15	6.65
Sharon, Pa. S3	6.45
Youngstown, U5	6.10

STRIP, Cold-Rolled Carbon

Anderson, Ind. (40) G6	5.50
Bridgeport, Conn. (10) S15	5.80
Buffalo, Pa. A10	5.10
Cleveland, A7	5.10
Detroit, M1	5.65
Dover, O. (40), G6	5.50
Ecorse, Mich. G5	5.30
Follansbee, W.Va. F4	5.10
Fontana, Calif. K1	6.75
Franklin Park, Ill. (40) T6	5.35
Ind. Harbor, Ind. I-2	5.35
Lackawanna, N.Y. B2	5.10
Los Angeles, C1	6.85
Mattapan, Mass. T6	5.95
Middletown, O. A10	5.10
New Britain (10), S15	5.80

STRIP, Cold-Finished, Spring Steel (Annealed)

	0.26-0.40C	0.41-0.60C	0.61-0.80C	0.81-1.05C	1.06-1.35C
Berea, O. C7		7.65	8.25	10.20	12.50
Bridgeport, Conn. (10) S15	5.80	7.65	8.25	10.20	12.50
Bristol, Conn. W1			8.55	10.50	
Carnegie, Pa. S18		7.65	8.25	10.20	12.50
Cleveland, A7	5.10	7.40	8.25	10.20	12.50
Dearborn, Mich. D3	6.05	7.90	8.50		
Detroit, D2	6.45	7.50	8.10		
Dover, O. G6	5.70	7.65	8.25	10.20	12.50
Franklin Park, Ill. T6	5.45	7.45	8.40	10.35	12.65
Harrison, N.J. C18			8.55	10.50	12.80
Mattapan, Mass. T6	5.95	7.60	8.55	10.50	12.80
New Britn., Conn. (10), S15	5.80	7.65	8.25	10.20	12.50
New Castle, Pa. B4	5.80	7.65	8.25	10.20	
New Castle, Pa. E5	5.80	7.65	8.25	10.20	12.50
New Haven, Conn. D2	6.70	7.60	8.20		
New York, W3		7.95	8.55	10.50	12.80
Pawtucket, R.I. N8, Cleve. or Pitts. Base		7.65	8.25	10.20	12.50
Worcester, Mass. Base	6.30	7.95	8.55	10.50	12.80
Sharon, Pa. S3	5.80	7.65	8.25	10.20	12.50
Trenton, N.J. R5		7.95	8.55	10.50	12.80
Wallingford, Conn. W2	6.30	7.60	8.20	10.15	12.65
Warren, O. T5	6.20	7.65	8.25	10.20	12.50
Weirton, W.Va. W6	5.80	7.65	8.25	10.20	12.50
Worcester, Mass. A7	5.40	7.60	8.55	10.50	12.80
Worcester, Mass. T6	5.95	7.60	8.55	10.50	12.80
Youngstown, U5		7.65	8.25	10.20	12.50

Spring Steel (Tempered)

Trenton, N.J. R5 (29)		10.30	12.50	15.35
Harrison, N.J. C18		10.30	12.50	15.35
New York, W3		10.30*	12.50*	15.35*
Youngstown, U5		10.30	12.50	15.35

* Plus $1.575 per 100 lb

NewBritain(10) S15	4.225
N.Tonawanda, N.Y. B11	3.725
Pittsburg, Calif. C11	4.475
Riverdale, Ill. A7	3.725
San Francisco, B7	5.00
Seattle (25), B3	4.725
Seattle, N14	4.75
Sharon, Pa. S3	4.225
So. Chicago, Ill. W14	3.725
So. San Francisco (25), B3	4.475
Sparrows Point, Md. B2	3.725
Sterling, Ill. N14	4.725
Torrance, Calif. C11	4.475
Warren, O. R2	3.725
Weirton, W.Va. W6	3.825
West Leechburg, Pa. A4	3.975
Youngstown, U5, Y1	3.725

STRIP, Hot-Rolled Alloy

Bridgeport, Conn. (10) S15	6.65
Carnegie, Pa. S18	6.45
Fontana, Calif. K1	7.30
Gary, Ind. U5	6.10
Houston, Tex. S5	6.50
Kansas City, Mo. S5	6.70
Midland, Pa. C18	5.85
New Britn. Conn. (10), S15	6.65
Sharon, Pa. S3	6.45
Youngstown, U5	6.10

STRIP, Cold-Rolled Carbon

Anderson, Ind. (40) G6	5.50
Bridgeport, Conn. (10) S15	5.80
Buffalo, Pa. A10	5.10
Cleveland, A7	5.10
Detroit, M1	5.65
Dover, O. (40), G6	5.50
Ecorse, Mich. G5	5.30
Follansbee, W.Va. F4	5.10
Fontana, Calif. K1	6.75
Franklin Park, Ill. (40) T6	5.35
Ind. Harbor, Ind. I-2	5.35
Lackawanna, N.Y. B2	5.10
Los Angeles, C1	6.85
Mattapan, Mass. T6	5.95
Middletown, O. A10	5.10
New Britain (10), S15	5.80

STRIP, Cold-Finished, Spring Steel (Annealed)

	0.26-0.40C	0.41-0.60C	0.61-0.80C	0.81-1.05C	1.06-1.35C
Berea, O. C7		7.65	8.25	10.20	12.50
Bridgeport, Conn. (10) S15	5.80	7.65	8.25	10.20	12.50
Bristol, Conn. W1			8.55	10.50	
Carnegie, Pa. S18		7.65	8.25	10.20	12.50
Cleveland, A7	5.10	7.40	8.25	10.20	12.50
Dearborn, Mich. D3	6.05	7.90	8.50		
Detroit, D2	6.45	7.50	8.10		
Dover, O. G6	5.70	7.65	8.25	10.20	12.50
Franklin Park, Ill. T6	5.45	7.45	8.40	10.35	12.65
Harrison, N.J. C18			8.55	10.50	12.80
Mattapan, Mass. T6	5.95	7.60	8.55	10.50	12.80
New Britn., Conn. (10), S15	5.80	7.65	8.25	10.20	12.50
New Castle, Pa. B4	5.80	7.65	8.25	10.20	
New Castle, Pa. E5	5.80	7.65	8.25	10.20	12.50
New Haven, Conn. D2	6.70	7.60	8.20		
New York, W3		7.95	8.55	10.50	12.80
Pawtucket, R.I. N8, Cleve. or Pitts. Base		7.65	8.25	10.20	12.50
Worcester, Mass. Base	6.30	7.95	8.55	10.50	12.80
Sharon, Pa. S3	5.80	7.65	8.25	10.20	12.50
Trenton, N.J. R5		7.95	8.55	10.50	12.80
Wallingford, Conn. W2	6.30	7.60	8.20	10.15	12.65
Warren, O. T5	6.20	7.65	8.25	10.20	12.50
Weirton, W.Va. W6	5.80	7.65	8.25	10.20	12.50
Worcester, Mass. A7	5.40	7.60	8.55	10.50	12.80
Worcester, Mass. T6	5.95	7.60	8.55	10.50	12.80
Youngstown, U5		7.65	8.25	10.20	12.50

Spring Steel (Tempered)

Trenton, N.J. R5 (29)		10.30	12.50	15.35
Harrison, N.J. C18		10.30	12.50	15.35
New York, W3		10.30*	12.50*	15.35*
Youngstown, U5		10.30	12.50	15.35

* Plus $1.575 per 100 lb

STRIP, Electro Galvanized

Dover, O. G6	5.50
Warren, O. T5	5.70
Weirton, W.Va. W6	5.10
Youngstown, U5	5.70

STRIP, Cold-Rolled Alloy Steel

Bridgeport, Conn. (10) S15	12.15
Carnegie, Pa. S18	12.00
Cleveland, A7	11.40
Dover, O. G6	11.90
Fontana, Calif. K1	13.05
Harrison, N.J. C18	12.00
Midland, Pa. C18	12.00
New Britn., Conn. (10) S15	12.15
Pawtucket, R.I. (11) N8	12.15
Pawtucket, R.I. (12) N8	11.45
Sharon, Pa. S3	12.00
Worcester, Mass. A7	11.70
Youngstown, U5	12.00

STRIP, Hot-Rolled Ingot Iron

Ashland, Ky. (8) A10	3.975
Warren, O. R2	4.325

STRIP, Cold-Rolled Ingot Iron

Warren, O. R2	5.70

TIGHT COOPERAGE HOOP

Atlanta, A11	4.45
Riverdale, Ill. A7	4.30
Sharon, Pa. S3	4.55
Youngstown, U5	4.15

STRIP, Electro Galvanized

Dover, O. G6	5.50
Warren, O. T5	5.70
Weirton, W.Va. W6	5.10
Youngstown, U5	5.70

STRIP, Cold-Rolled Alloy Steel

Bridgeport, Conn. (10) S15	12.15
Carnegie, Pa. S18	12.00
Cleveland, A7	11.40
Dover, O. G6	11.90
Fontana, Calif. K1	13.05
Harrison, N.J. C18	12.00
Midland, Pa. C18	12.00
New Britn., Conn. (10) S15	12.15
Pawtucket, R.I. (11) N8	12.15
Pawtucket, R.I. (12) N8	11.45
Sharon, Pa. S3	12.00
Worcester, Mass. A7	11.70
Youngstown, U5	12.00

STRIP, Hot-Rolled Ingot Iron

Ashland, Ky. (8) A10	3.975
Warren, O. R2	4.325

STRIP, Cold-Rolled Ingot Iron

Warren, O. R2	5.70

TIGHT COOPERAGE HOOP

Atlanta, A11	4.45
Riverdale, Ill. A7	4.30
Sharon, Pa. S3	4.55
Youngstown, U5	4.15

Key to Producers

A1 Acme Steel Co.
A2 Alan Wood Steel Co.
A4 Allegheny Ludlum Steel
A7 American Steel & Wire
A8 Anchor Drawn Steel Co.
A9 Angel Nail & Chaplet
A10 Armco Steel Corp.
A11 Atlantic Steel Co.
A13 American Cladmetals Co.

B1 Babcock & Wilcox Co.
B2 Bethlehem Steel Co.
B3 Beth. Pac. Coast Steel
B4 Blair Strip Steel Co.
B5 Bliss & Laughlin Inc.
B6 Bonard Steel Corp.
B8 Brewster Standard Steel
B11 Buffalo Bolt Co.
B12 Buffalo Steel Div., H. K. Porter Co.
B14 A. M. Byers Co.

C1 Calstrip Steel Corp.
C2 Calumet Steel Div. Borg-Warner Corp.
C4 Carpenter Steel Co.
C9 Central Iron & Steel Div. Barium Steel Corp.
C7 Cleve. Cold Rolling Mills
C8 Cold Metal Products Co.
C9 Colonial Steel Co.
C10 Colorado Fuel & Iron
C11 Columbia-Geneva Steel
C12 Columbia Steel & Shaft
C14 Columbia Tool Steel Co.
C14 Compressed Steel Shaft
C16 Continental Steel Corp.
C17 Copperweld Steel Co.
C18 Crucible Steel Co.
C19 Cumberland Steel Co.
C20 Cyclone Steel & Wire
C22 Claymont Steel Corp.

D2 Detroit Steel Corp.
D3 Detroit Tube & Steel
D4 Duston & Sons, Henry
D6 Dyn'ver Harr. Co.
D7 Dickson Weatherproof Nail Co.

E1 Eastern Gas & Fuel Assoc.
E2 Eastern Stainless Steel
E4 Electro Metallurgical Co.
E5 Elliott Bros. Steel Co.
E6 Empire Steel Corp.

F2 Firth Sterling Inc.
F3 Fitzsimons Steel Co.
F4 Follansbee Steel Corp.
F5 Franklin Steel Div. Borg-Warner Corp.
F6 Fretz-Moon Tube Co.
F7 Ft. Howard Steel & Wire

G2 Globe Iron Co.
G3 Globe Steel Tubes Co.
G4 Granite City Steel Co.
G5 Great Lakes Steel Corp.
G6 Greer Steel Co.

H1 Hanna Furnace Corp.

I-1 Igoe Bros. Inc.
I-2 Inland Steel Co.
I-3 Interlake Iron Corp.
I-4 Ingersoll Steel Div. Borg-Warner Corp.
I-7 Indiana Steel & Wire Co.

J1 Jackson Iron & Steel Co.
J3 Jessop Steel Co.
J4 Johnson Steel & Wire Co.
J5 Jones & Laughlin Steel
J6 Joslyn Mfg. & Supply
J7 Judson Steel Corp.
J8 Jersey Shore Steel Co.

K1 Kaiser Steel Corp.
K2 Kokomo Electro-Metals
K3 Keystone Drawn Steel
K4 Keystone Steel & Wire

L1 Laclede Steel Co.
L2 LaSalle Steel Co.
L3 Latrobe Steel Co.
L5 Lockhart Iron & Steel
L6 Lone Star Steel Co.
L7 Lukens Steel Co.

WIRE, Merchant Quality

	An'ld	Galv.
16 to 8 gage		
AlabamaCity R2	6.075	6.325
Aliquippa J5	6.075	6.45*
Atlanta A11	6.325	6.675
Bartonville(19) K4	6.075	6.40
Buffalo W12	6.225	
Cleveland A7	6.075	6.225
Crawfordsville Ms	6.075	6.50
Donora,Pa. A7	6.075	6.225
Duluth,Minn. A7	6.075	6.225
Fairfield T2	6.075	6.225
Houston,Tex. B5	6.475	6.625
Johnstown B2	6.075	6.45†
Joliet,Ill. A7	6.075	6.225
KansasCy Mo. S5	6.075	6.50
Kokomo C16	6.175	6.425
LosAngeles B3	7.025	
Minnequa C14	6.325	6.70*
Monessen P7	6.075	6.45
Palmer W12	6.325	
Pitts Calif. C11	7.025	7.175
Prtsmth.(13) P12	6.175	6.425
Rankin A7	6.075	6.225
So Chicago R2	6.075	6.325
So S.Fran. C10	7.025	7.40*
SparrowsPt. B2	6.175	6.50†
Sterling,Ill.(1) N15	6.075	6.40
Struthers,O. Y1	6.075	6.475
Torrance,Cal. C11	7.025	
Worcester A7	6.375	6.525

* Based on 14-cent zinc. † 14.50-cent zinc.

ROPE WIRE

Alton,Ill. L1	9.15
Bartonville,Ill. K4	8.85
Buffalo W12 (43)	8.85
Fostoria,O. S1 (43)	8.85
Johnstown,Pa. B2 (43)	8.85
Monessen,Pa. P16 (43)	8.85
Monessen,Pa. P7 (43)	8.80
Muncie,Ind. I-7 (43)	8.75
Palmer,Mass. W12 (43)	8.85
Portsmouth,O. P12 (43)	8.85
Roebling,N.J. R5 (43)	8.85
SparrowsPt. B2 (43)	8.85
Struthers,O. Y1 (43)	8.85
Worcester J4, T6 (43)	8.85

(A) Plow and Mild Plow; add 0.25c for improved plow.

WIRE, Manufacturers Bright, Low Carbon

AlabamaCity,Ala. R2	5.225
Aliquippa,Pa. J5 (42)	4.85
Atlanta A11	5.475
Alton,Ill. L1	5.45
Bartonville,Ill. K4	5.325
Buffalo W12	5.225
Chicago W13	5.475
Cleveland A7, C20	5.225
Crawfordsville,Ind. M8	5.325
Donora,Pa. A7	5.225
Duluth,Minn. A7	5.225
Fairfield,Ala. T2	5.225
Fostoria,O. (24) S1	5.225
Houston S5	5.625
Johnstown,Pa. B2	5.225
Joliet,Ill. A7	5.225
KansasCity,Mo. S5	5.825
Kokomo,Ind. C16	5.325
LosAngeles B3	6.175
Minnequa,Colo. C10	5.475
Monessen,Pa. P7	5.475
Newark 6-8 ga 1-1	5.88
No.Tonawanda B11	5.225
Palmer,Mass. W12	5.325
Pittsburg,Calif. C11	6.175
Portsmouth,O. P12	5.625
Rankin,Pa. A7	5.225
So.Chicago,Ill. R2	5.225
So.SanFrancisco C10	6.175
SparrowsPoint,Md. B2	5.325
Sterling,Ill.(1) N15	5.225
Struthers,O. Y1	5.225
Worcester A7	5.225

* Based on 14-cent zinc. † Includes 4.7% increase.

WIRE, MB Spring, High Carbon

Aliquippa,Pa. J5 (43)	6.25
Alton,Ill. L1	6.85
Bartonville,Ill. K4	6.64
Buffalo W12 (43)	6.25
Cleveland A7 (43)	6.25
Donora,Pa. A7 (43)	6.25
Duluth,Minn. A7 (43)	6.25
Fostoria,O. S1 (43)	6.25
Johnstown,Pa. B2 (43)	6.25
Millbury(12) N6 (43)	8.05
Minnequa,Colo. C10 (43)	6.50
Monessen,Pa. P7 (43)	6.25
Monessen,Pa. P16	6.75
Muncie,Ind. I-7 (43)	6.45
Palmer,Mass. W12 (43)	6.50
Pittsburg,Calif. C11(43)	7.20
Roebling,N.J. R5 (43)	6.55
Portsmouth,O. P12(42)	6.25
So.Chicago,Ill. R2 (43)	6.25
So.SanFran. C10 (43)	7.20
SparrowsPt. Md. B2 (43)	6.35
Struthers,O. Y1 (43)	6.25
Trenton,N.J. A7 (43)	6.55
Waukegan,Ill. A7 (43)	6.25
Worcester A7, T6 (43)	6.55
Worcester,Mass. W12(43)	6.55
Worcester,Mass. J4 (43)	6.75

WIRE, Tire Bead

Bartonville,Ill. K4	11.51
Monessen,Pa. P16 (43)	11.40
Roebling,N.J. R5 (43)	11.55

WIRE, Fine & Weaving (8" Coils)

Bartonville,Ill. K4	9.42
Buffalo W12 (43)	8.90
Chicago W13	9.32
Cleveland A7 (43)	8.90
Crawfordsville,Ind. MS(43)	8.90
Fostoria,O. S1 (43)	8.90
Johnstown,Pa. B2 (43)	8.90
Kokomo,Ind. C16 (43)	8.90
Monessen,Pa. P16 (43)	8.90
Muncie,Ind. I-7 (43)	9.10
Palmer,Mass. W12 (43)	9.20
Roebling,N.J. R5 (43)	9.10
Waukegan,Ill. A7 (43)	8.90
Worcester,Mass. A7, T6(43)	9.20

WIRE, Barbed

	Col.
AlabamaCity,Ala. R2	144
Aliquippa,Pa. J5	147*
Atlanta A11	145
Bartonville,Ill.(19) K4	146
Crawfordsville,Ind. Ms	
Donora,Pa. A7	142
Duluth,Minn. A7	142
Fairfield,Ala. T2	142
Houston,Tex. S5	150
Johnstown,Pa. B2	142
Joliet,Ill. A7	142
KansasCity,Mo. S5	154
Kokomo,Ind. C16	145
Minnequa,Colo. C10	145*
Monessen,Pa. P7	147
Portsmouth,O. P12	162
Rankin,Pa. A7	142
So.Chicago,Ill. R2	144
So.SanFran.,Calif. C10	167*
SparrowsPoint,Md. B2	145
Sterling,Ill.(1) N15	146

* Based on 14-cent zinc.

WIRE, Upholstery Spring

Aliquippa,Pa. J5	6.275
Alton,Ill. L1	6.50
Buffalo W12	6.275
Cleveland A7	6.275
Donora,Pa. A7	6.275
Duluth,Minn. A7	6.275
Johnstown,Pa. B2	6.275
LosAngeles B3	7.225
Minnequa,Colo. C10	6.525
Monessen,Pa. P7	6.275
Monessen,Pa. P16 (42)	6.40
NewHaven,Conn. A7	6.675
Palmer,Mass. W12	6.575
Pittsburg,Calif. C11	7.225
Portsmouth,O. P12	6.275
Roebling,N.J. R5	6.575
So.Chicago,Ill. R2	6.275
So.SanFrancisco C10	7.225
SparrowsPt. Md. B2	6.375
Torrance,Calif. C11	7.225
Trenton,N.J. A7	6.575
Waukegan,Ill. A7	6.275
Worcester,Mass. A7	6.575

WOVEN FENCE,9-15½ ga.

	Col.
AlabamaCity,Ala. R2	135
Ala.City,Ala.,17-15ga.R2	132
Aliquippa,Pa.9-14½ga.J5	131
Atlanta A11	140
Bartonville,Ill.(19) K4	137
Crawfordsville,Ind. M8	140
Donora,Pa. A7	133
Duluth,Minn. A7	133
Fairfield,Ala. T2	133
Houston,Tex. S5	141
Johnstown,Pa. B2	138
Johnstown,17ga.,6" B2	229
Joliet,Ill. A7	133
KansasCity,Mo. S5	145
Kokomo,Ind. C16	140
Minnequa,Colo. C10	140*
Monessen,Pa. P7	138
Pittsburg,Calif. C11	156
Rankin,Pa. A7	133
So.Chicago,Ill. R2	135
Sterling,Ill.(1) N15	137

* Based on 14-cent zinc.

BALE TIES, Single Loop

	Col.
AlabamaCity,Ala. R2	132
Atlanta A11	132
Bartonville,Ill.(19) K4	132
Crawfordsville,Ind. M8	134
Donora,Pa. A7	132
Duluth,Minn. A7	132
Fairfield,Ala. T2	132
Joliet,Ill. A7	132
KansasCity,Mo. S5	144
Kokomo,Ind. C16	134
Minnequa,Colo. C10	137
Pittsburg,Calif. C11	156
So.Chicago,Ill. R2	132
So.SanFran.,Calif. C10	156
SparrowsPoint,Md. B2	134
Sterling,Ill.(1) N15	132

FENCE POSTS

ChicagoHts.,Ill. C2	145
Duluth,Minn. A7	133
Franklin,Pa. F5	145
Huntington,W.Va. W7	148
Johnstown,Pa. B2	148
Marion,O. P11	140
Minnequa,Colo. C10	138
Moline,Ill. R2	136
So.Chicago,Ill. R2	140
Tonawanda,N.Y. B12	148
Williamsport,Pa. S19	158

TRACK BOLTS (20) Treated

KansasCity,Mo. S5	9.85
Lebanon,Pa. (31) B2	9.85
Minnequa,Colo. C10	9.85
Pittsburgh Oil, P14	9.85

AXLES

Ind Harbor,Ind. S13	5.65
Johnstown,Pa. B2	5.65

NAILS, Stock

To dealers & mfrs (7)	Col.
AlabamaCity,Ala. R2 (44)	118
Aliquippa,Pa. J5 (44)	118
Atlanta A11	118
Bartonville,Ill.(19) K4	127
Ind Harbor,Ind. I-2	118
Chicago,Ill. W13 (44)	118
Cleveland A9 (44)	125
Crawfordsville,Ind. M8	130
Donora,Pa. A7 (44)	118
Duluth,Minn. A7 (44)	118
Fairfield,Ala. T2 (44)	118
Galveston,Tex. I7 (44)	126
Houston,Tex. S5 (44)	126
Johnstown,Pa. B2 (44)	118
Joliet,Ill. A7 (44)	118
KansasCity,Mo. S5 (44)	130
Kokomo,Ind. C16	129
Minnequa,Colo. C10 (44)	123
Monessen,Pa. P7	127
Pittsburg,Calif. C11 (44)	137
Portsmouth,O. P12	132
Rankin,Pa. A7 (44)	118
So.Chicago,Ill. R2	118
SparrowsPoint,Md. B2(44)	120
Sterling,Ill.(1) N15 (44)	118
Torrance,Calif. C11 (44)	138
Worcester,Mass. A7 (44)	124

NAILS, Cut (100 lb kegs)

To dealers (33)	
Conshohocken,Pa. A3	$7.80
Wheeling,W.Va. W10	7.80

TIE PLATES

Fairfield,Ala. T2	4.775
Gary,Ind. U5	4.775
Ind Harbor,Ind. I-2	4.775
Lackawanna,N.Y. B2	4.775
Minnequa,Colo. C10	$95.50*
Pittsburg,Calif. C11	4.925
Seattle B3	4.925
Steelton,Pa. B2	4.775
Torrance,Calif. C11	4.925

* Per net ton.

JOINT BARS

Bessemer,Pa. U5	4.925
Fairfield,Ala. T2	4.925
Ind Harbor,Ind. I-2	4.925
Joliet,Ill. U5	4.925
Lackawanna,N.Y. B2	4.925
Minnequa,Colo. C10	4.925
Steelton,Pa. B2	4.925

STANDARD TRACK SPIKES

Ind Harbor,Ind. I-2, Y1	6.65
KansasCity,Mo. S5	6.90
Lebanon,Pa. B2	6.65
Minnequa,Colo. C10	6.65
Pittsburgh J5	6.65
Seattle B3	7.15
So.Chicago,Ill. R2	6.65
Struthers,O. Y1	6.65
Youngstown R2	6.65

RAILS	Std. No. 1	Std. No. 2	Std. All No. 1	Std. Too Rails 60 lb Under
Bessemer,Pa. U5	3.775	3.675	3.725	4.25
Ensley,Ala. T2	3.775	3.675		4.25
Fairfield,Ala. T2				4.25
Gary,Ind. U5	3.775	3.675	3.725	
Huntington,W.Va. W7				5.25
Ind Harbor,Ind. I-2	3.775	3.675	3.725	
Johnstown,Pa. B2				(16)4.25
Lackawanna,N.Y. B2	3.775	3.675		4.25
Minnequa,Colo. C10	$75.50*	$73.50*		4.75
Steelton,Pa. B2	3.775	3.675		
Williamsport,Pa. S19				5.00

* Per net ton.

TOOL STEEL

(Prices subject to 4.7% increase)

Grade	$ per lb
Regular Carbon	0.230
Extra Carbon	0.270
Special Carbon	0.325
Oil Hardening	0.350
5% Cr Hot Work	0.550
Hi Carbon Cr	0.635

Grade by Analysis

W	Cr	V	Co	
18	4	1		1.505
18	4	2		1.65-1.66
20	23	4	25 1.6	12 25 3 535-3.675
19	4	2	4	2.460
18	25	4	25 1	4 75 2.125
18	4	2	9	2.445-2.45
13.5	4	3		1.6025
9	3	25	0.5	1.01

W	Cr	V	Mo	
6.4	4.5	1.9	5	0.96-0.965
6	4	2	6	1.190
1.5	4	1	8.5	0.810

Tool steel producers include: A4, A8, B2, B8, C4, C9, C13, C18, D4, F2, J3, L3, M14, S8, U4, V2 and V3.

Footnotes

(1) Chicago base.
(2) Angles, flats, bands.
(3) Merchant.
(4) Reinforcing.
(5) Chicago or Birm. base.
(6) To jobbers, 5 ton lots.
(7) 16 gage and heavier.
(8) 6 in. and narrower.
(9) Pittsburgh base.
(10) Cleveland & Pitts. base.
(11) Worcester, Mass. base.
(12) Worcester, Mass. base.
(13) Add 0.50c for 17 Ga. & heavier.
(15) 3/8" and thinner.
(16) 40 lb and under.
(17) Flats only.
(18) To dealers.
(19) Chicago & Pitts. base.
(20) 0.25c off for untreated.
(21) New Haven Conn., base.
(22) Del San Francisco Bay area, add 0.50c.
(23) 20 Ga. 36" wide.
(24) Deduct 0.20c, finer than 15 Ga.
(25) Bar mill bands.
(26) Reinforcing, mill lengths, to fabricators; to consumers, 50c.
(27) Bar mill sizes.
(28) Binderized.
(29) Add $3.50 per ton.
(30) Sheared; add 0.35c for universal mill.
(31) Not annealed.
(32) Rd. or square edge.
(33) To jobbers, deduct 20c.
(34) 7.85c for cut lengths.
(35) 72" and narrower.
(36) 54" and narrower.
(37) 12 ga. & lighter, 60" & narrower.
(38) 14 gage & lighter, 48" & narrower.
(39) 48" and narrower.
(40) Lighter than 0.035", 0.035" and heavier, 0.25c higher.
(41) 9-10c for cut lengths.
(42) Plus 0.375c per 100 lb.
(43) Plus 4.7% on base and extras.
(44) Plus 45c per 100 lb.
(45) Plus 40c per 100 lb.

Key to Producers

M1	McLouth Steel Corp.	P12	Portsmouth Division, Detroit Steel Corp.
M4	Mahoning Valley Steel	P13	Precision Drawn Steel
M5	Medart Co.	P14	Pitts. Screw & Bolt Co.
M6	Mercer Tube & Mfg. Co	P15	Pittsburgh Metallurgical
M8	Mid-States Steel & Wire	P16	Page Steel & Wire Div., Amer. Chain & Cable
M9	Midvale Co.	P17	Plymouth Steel Co.
M12	Multrup Steel Products	R1	Reeves Steel & Mfg. Co.
M13	Monarch Steel Co.	R2	Republic Steel Corp.
M14	McInnes Steel Co.	R3	Rhodes Island Steel Corp.
N2	National Supply Co.	R5	Roebling's Sons, John A.
N3	National Tube Div.	R6	Rome Strip Steel Co.
N5	Nelsen Steel & Wire Co.	R7	Rotary Electric Steel Co.
N6	NewEng-HighCarb Wire	R8	RellanceDiv. EatonMfg.
N8	Newman-Crosby Steel	S1	Seneca Wire & Mfg. Co.
N12	Niles Rolling Mill Div.	S3	Sharon Steel Corp.
N14	Northwest. Steel Roll. Mills	S5	Sheffield Steel Corp.
N15	Northwestern S.&W. Co.	S6	Sheridan Furnace Co.
N16	New Delphos Mfg. Co.	S7	Simmons Co.
O3	Oliver Iron & Steel Corp.	S8	Simonds Saw & Steel Co.
O4	Oregon Steel Mills	S9	Slos-Sheffield S.&I. Div.
P1	Pacific States Steel Corp.	S13	Standard Forgings Corp.
P2	Pacific Tube Co.	S14	Standard Tube Co.
P4	Phoenix Iron & Steel Co.	S15	Stanley Works
P5	Pilgrim Drawn Steel	S16	Struthers Iron & Steel
P6	Pittsburgh Coke & Chem.	S17	Superior Drawn Steel Co.
P7	Pittsburgh Steel Co.	S18	Superior Steel Corp.
P9	Pittsburgh Tube Co.	S19	Sweet's Steel Co.
P11	Pollak Steel Co.	S20	Southern States Steel
		S24	Seidelhuber Steel
		T2	Tenn. Coal & Iron Div.
		T3	Tenn. Prod. & Chem.
		T4	Texas Steel Co.
		T5	Thomas Strip Division, Pittsburgh Steel Co.
		T6	Thompson Wire Co.
		T7	Timken Roller Bearing
		T9	Tonawanda Iron Div., Am. Rad. & Stan. San.
		U4	Universal Cyclops Steel
		U5	United States Steel Co.
		V2	Vanadium-Alloys Steel
		V3	Vulcan Crucible Steel Co.
		W1	Wallace Barnes Co.
		W2	Wallingford Steel Co.
		W3	Washburn Wire Co.
		W4	Washington Steel Corp.
		W6	Weirton Steel Co.
		W7	W. Va. Steel & Mfg. Co.
		W8	West Auto Mach Screw
		W9	Wheatland Tube Co.
		W10	Wheeling Steel Corp.
		W12	Wickwire Spencer Steel Div., Colo. Fuel & Iron
		W13	Wilson Steel & Wire Co.
		W14	Wisconsin Steel Div. International Harvester
		W15	Woodward Iron Co.
		W18	Wyckoff Steel Co.
		Y1	Youngstown Sheet&Tube

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Since 1907 your purchase of Christmas Seals has helped cut the TB death rate substantially.

Yet the threat and problems of tuberculosis are still enormous.

TB is still the No. 1 infectious killer. And, ironically, as more patients are discovered and treated, *new problems are created!* More hospital beds are needed . . . more trained doctors and nurses . . . more help in rehabilitation. Your Christmas Seal dollars help solve these and other problems through popular and professional education, case finding, and research.

So, please, send in your contribution today. Keep the fight against TB a winning one!

Buy Christmas Seals!

Because of the importance of this message, space contributed by

STEEL

The Weekly Magazine of Metalworking

BUTTWELD STANDARD PIPE, T & C Carload discounts from list, %

Size—Inches	⅛	¼	⅜	½	¾	1	1¼	1½	2	2½	3
List Per Ft	8.5c	11.5c	17c	23c	27.5c	37c	58.5c	76.5c
Pounds Per Ft	0.85	1.13	1.68	2.28	2.73	3.68	5.82	7.62

	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv
Aliquippa, Pa. J5 (†)	32.5	15.25	35.5	18.25	38	20.75	38.5	20.5	39	21	39.5	21.5	40	21.25	40	21.25
Alton, Ill. L1	29.5	10.5	32.5	14.5	35	18	35.5	18.5	36	19.5	36.5	20	37	20.5	37	20.5
Benwood, W. Va. W10	32.5	13.25	35.5	17.25	38	20.75	38.5	20.5	39	21.5	39.5	22	40	21.75	40	21.75
Etna, Pa. N2 (†)	32.5	13.25	35.5	17.25	38	20.75	38.5	20.5	39	22.25	39.5	22	40	21.75	40	21.75
Fontana, Calif. K1 (†)	21	1.75	24	5.75	28.5	9.25	27	9	27.5	10	28	10.5	28.5	10.25	28.5	10.25
Ind. Harbor, Ind. Y1 (†)	31.5	14.25	34.5	18.25	37	21.75	37.5	21	38	22	38.5	22.25	39	21.75	39	21.75
Lorain, O. N3 (†)	32.5	22.25	35.5	26.25	38	29.75	38.5	27.25	39	28.25	39.5	28.75	40	26.25	40	26.25
Sharon, Pa. M6	32.5	14.25	35.5	18.25	38	21.25	38.5	20.50	39	21.00	39.5	21.50	40	20.75	40	20.75
Sparrows Pt., Md. B2	30.5	11.25	33.5	15.25	36	18.75	36.5	18.5	37	19.5	37.5	20	38	19.75	38	19.75
Youngstown R2 (†)	32.5	13.25	35.5	19.25	38	22.75	38.5	22.00	39	23.00	39.5	23.50	40	22.75	40	22.75
Youngstown Y1 (†)	32.5	13.25	35.5	19.25	38	22.75	38.5	22.00	39	23.00	39.5	23.50	40	22.75	40	22.75
Wheatland, Pa. W9	32.5	13.25	35.5	16.25	38	18.75	38.5	18	39	19.5	39.5	20	40	20.25	40	20.25

SEAMLESS STANDARD PIPE, T & C Carload discounts from list, %

Size—Inches	2	2½	3	3½	4	5	6
List Per Ft	37c	58.5c	76.5c	92c	$1.09	$1.48	$1.92
Pounds Per Ft	3.68	5.82	7.62	9.20	10.89	14.81	19.18

	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv
Aliquippa, Pa. J5 (†)	24	6	27	8.25	27	8.25	29	10.25	29	10.25	33.75	15	33.75	15
Ambridge, Pa. N2	24	6	27	8.25	27	8.25	29	10.25	29	10.25	33.75	15	33.75	15
Lorain, O. N3 (†)	24	12.75	27	12.75	27	12.75	29	14.75	29	14.75	33.75	19.5	33.75	19.5
Youngstown Y1 (†)	24	7.50	27	9.25	27	9.25	29	11.25	29	11.25	33.75	16	33.75	16

ELECTRIC WELD STANDARD PIPE, T & C

Youngstown, R2 (†)	24	7.50	27	9.25	27	9.25	29	11.25	29	11.25	33.75	16	33.75	16

BUTTWELD STANDARD PIPE, T & C Carload discounts from list, %

Size—Inches	⅛	¼	⅜	½	¾	1	1¼	1½	2
List Per Ft	5.5c	9c	9c	9.2c	$1.09
Pounds Per Ft	0.24	0.42	0.57	0.80	10.89

	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv
Benwood, W. Va. W10	29.5	+0.25	23.25	+3.5	17.75	+7.75	33	14.25	33	14.25	...	...
Butler, Pa. B6 (†)	30.5	1.25	20	+1.75	20	+5.5	...	...	...	...	...	...
Etna, Pa. N2 (†)	30.5	1.25	25	+1.75	20	+5.5	33	14.25	33	14.25	...	...
Sharon, Pa. M6 (‡)	29.5	+0.25	23	+4.25	18	+8.25	...	...	...	...	...	...
Sparrows Pt., Md. B2	28.5	+0.75	23	+3.75	18	+7.50	...	...	...	...	...	...
Youngstown R2 (†)	...	...	...	...	...	...	33	15.25	33	15.25	...	...
Wheatland, Pa. W9	28.5	+0.75	23	+3.75	18	+7.50	...	...	...	...	...	...

Galvanized pipe discounts based on zinc price of (†) 14c; (‡) 12.50c; (§) 14.50c; (**) 9c with discounts adjusted depending on price of zinc at time of shipment.

CLAD STEELS

(Cents per pound, add 4.7c to base price and extras)

Cladding Stainless	Plates—Carbon Base 10%	Plates—Carbon Base 20%	Sheets—Carbon Base 10%	Sheets—Carbon Base 20%	Sheets—Copper Base Both Sides
302	25.00	29.50	24.50	27.50-27.77	77.00
304	25.00	29.50	24.50	27.50-27.77	77.00
309	30.50	35.00	...	...	...
310	36.50	42.00	...	...	144.00
316	29.50	34.00	26.00	35.92-36.50	...
317	34.50	39.00	...	...	...
318	33.50	38.00	...	...	...
321	26.50	31.00-32.00	23.00	33.00	111.00
347	27.50	32.00	24.00	33.50-33.83	130.00
405	23.25	27.75	...	...	...
410	26.75	27.25	...	...	...
Nickel	33.50	45.15	...	...	4
Inconel	41.23	54.18	...	...	165.00
Monel	34.93	46.28	...	...	...
Copper*	...	...	...	44.00	...

	Strip—Carbon Base—Cold-Rolled 10%	Strip—Carbon Base—Cold-Rolled Both Sides	Strip—Carbon Base—Hot-Rolled 10%	Strip—Carbon Base—Hot-Rolled Both Sides
Nickel	41.00	54.00	...	...
Copper*	23.70	29.65	20.20	26.40

* Deoxidized. Production points for carbon base products: Stainless plates, sheets, Conshohocken, Pa. A3 and New Castle, Ind. I4; stainless-clad plates, Claymont, Del. C22, Coatesville, Pa. L7 and Washington, Pa. J3; nickel, Inconel, monel-clad plates, Coatesville L7; nickel copper-clad strip, Carnegie, Pa. S18; Production point for copper-base sheets is Carnegie, Pa. A13.

BOLTS, NUTS

CARRIAGE, MACHINE BOLTS

(F.o.b. midwestern plants per cent off list for less than case lots to consumers)

6 in. and shorter:

½-in. & smaller diam.	15
⅝-in. & ¾-in.	18.5
⅞-in. and larger	17.5
Longer than 6 in.:	
All diams.	14
Lag Bolts, all diams.:	
6 in. and shorter	23
over 6 in. long	21
Ribbed Necked Carriage	18.5
Blank	34
Plow	34
Step, Elevator, Tap and Sleigh Shoe	21
Tire Bolts	21
Boiler & Fitting-Up Bolts	31

NUTS

H.P. & C.P.	Reg. Hvy.
Square:	
½-in. & smaller	15 15
⅝-in. & ¾-in.	12 6.5
⅞-in.-1⅛-in.	9 1
1⅛-in. & larger	7.5 -1
H.P. Hex.:	
½-in. & smaller	26 22
⅝-in. & ¾-in.	16.5 6.5
⅞-in.-1½-in.	12 2
1⅝-in. & larger	8.5 2
C.P. Hex.	
½-in. & smaller	26 22
⅝-in. & ¾-in.	23 17.5
⅞-in. & 1½-in.	19.5 12
1⅝-in. & larger	12 6.5

SEMIFINISHED NUTS

American Standard

(Per cent off list for less than case or keg quantities)

	Reg.	Hvy.
½-in. & smaller	35	28.5
⅝-in. & ¾-in.	29.5	22
⅞-in.-1½-in.	24	15
1⅝-in. & larger	13	8.5
		Light
½-in. & smaller		35
⅝-in. to ¾-in.		28.5
⅞-in. to 1½-in.		26

SQUARE HEAD SET SCREWS

(Packaged; per cent off list)

1 in. diam x 6 in. and shorter	38
1 in. and smaller diam. x over 6 in.	26

HEADLESS SET SCREWS

(Packaged; per cent off list)

No. 10 and smaller	35
¼-in. diam. & larger	16
N.F. thread; all diams.	10

STEEL STOVE BOLTS

(F.o.b. plant, per cent off list in packages)

Plain finish	48 & 10
Plated finishes	31 & 10

HEXAGON CAP SCREWS

(1020 steel, packaged; per cent off list)

6 in. or shorter:

⅝-in. & smaller	42
¾-in. through 1 in.	34
Longer than 6 in.:	
⅝-in. & smaller	26
¾-in. through 1 in.	4

METALLURGICAL COKE

Price net ton

BEEHIVE OVENS

Connellsville fur.	$14.50-15.00
Connellsville fdy.	16.50-17.50
New River foundry	20.50
Wise county foundry	15.95
Wise county furnace	13.20

OVEN FOUNDRY COKE

Kearney, N. J. ovens	$22.75
Everett, Mass., ovens	
New England, del.	*24.80
Chicago, ovens	24.50
Chicago, del.	26.00
Terre Haute, ovens	24.05
Milwaukee, ovens	23.25
Indianapolis, ovens	24.25
Chicago, del.	28.12
Cincinnati, del.	25.85
Ironton, O., ovens	22.50
Cincinnati, del.	25.12
Painesville, O., ovens	24.00
Cleveland, del.	25.82
Erie, Pa., ovens	23.50
Birmingham, ovens	20.30
Cincinnati, del.	25.23
LoneStar, Tex., ovens	18.50
Philadelphia, ovens	23.95
Neville Island, Pa., ovens	23.00
Sweetland, Pa., ovens	22.60
St. Louis, ovens	
St. Louis, del.	25.40
Portsmouth, O., ovens	22.50
Cincinnati, del.	25.12
Detroit, ovens	24.00
Detroit, del.	25.00
Buffalo, del.	26.58
Flint, del.	26.73
Pontiac, del.	25.56
Saginaw, del.	27.08

*Or within $4.55 freight zone from works.

NOTE: Current prices on boiler tubes, coal chemicals, fluorspar, electrodes and rivets appeared on page 155, Nov. 24 issue.

STAINLESS STEEL

(Add 4.7c on base price and extras)

Type	Sheets	C.R. Strip	Bars Wire Structurals
301	41.00	34.00	31.25
302	41.25	36.75	31.50
303	43.25	40.25	34.00
304	43.25	38.75	33.00
309	56.00	55.00	44.75
316	57.00	59.00	49.25
321	49.25	48.25	37.00
347	53.75	52.25	41.50
410	36.50	36.50	25.75
416	37.00	37.00	26.25
420	44.00	47.00	31.25
430	39.00	31.00	26.25
501	27.50	26.00	14.25
502	28.50	27.00	15.25

Bolt, Types 301-347 and 430 sheets, except 303 and 309 F2.

Brackenridge, Pa. sheets A4 quotes slight variations on Types 301-347.

Bridgeville, Pa., bars, wire, sheets & strip U4.

Butler, Pa. sheets and strip except Types 303, 309, 416, 420, 501 & 502 A10.

Carnegie, Pa., sheets and strip, except Types 303, 416, 501 & 502 S18.

Cleveland, strip A7.

Detroit, strip M1 quotes 34.00c on Type 301; 36.50c, 302; 38.50c, 304; 58.50c, 316; 52.00c, 347; 36.50c, 410; 31.00c, 430.

Dunkirk, N. Y., bars, wire A4 quotes slight variations on Types 301-347.

Duquesne, Pa., bars U5.

Fort Wayne, Ind., bars and wire, except Types 501 & 502 J6 quotes slight variations on Types 301-347.

Gary, Ind., sheets, except Type 416 U5.

Harrison, N. J., strip and wire C18.

Massillon, O., all items, R2.

McKeesport, Pa., strip, Type 410, bars & wire, Types 410 through 430 and 31.25c on Type 302, 33.75c on 303, 32.75c on 304, 48.75c on 316, 36.75c on 321, 41.25c on 347, F2.

McKeesport, Pa., bars, sheets except Type 416, U5.

Middletown, O., sheets and strip except Types 303, 416, 420, 501 and 502, A10.

Midland, sheets & strip C18.

Munhall, Pa., bars U5.

Muncie, Ind., wire 1-7 quotes Types 302, 304, 430.

Pittsburgh, sheets C18.

Reading, Pa., strip, except 34.25c on Type 301 and 56.00c on 309; bars, except 31.50c on Type 301 and 45.25c on 309, C4.

Sharon, Pa., strip, except Types 303, 309, 416, 501, 502 and 34.25c on Type 301 S3.

So. Chicago, Ill., bars & structurals U5.

Syracuse, N. Y., bars, wire & structurals C18.

Titusville, Pa., bars U4.

Wallingford, Conn., strip W2 quotes 0.25c higher.

Washington, Pa., bars, sheets & strip, except 0.25c higher, on Type 301, J3.

Washington, Pa., Types 301 through 347 sheets & strip except 303, 309, 316 sheets 62.00c, strip 64.00c W4.

Watervliet, N. Y., structurals & bars, A4 quotes variations on Types 301-347.

Waukegan, bars & wire A7.

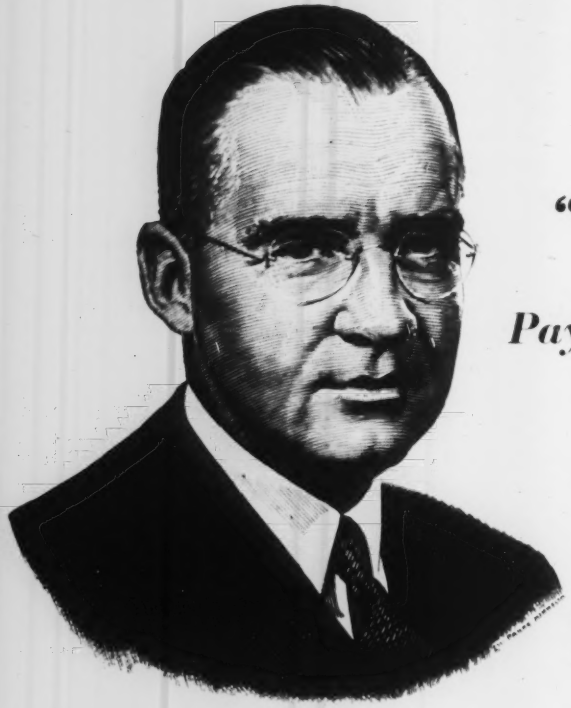
West Leechburg, Pa., strip, A4 quotes slight variations on Types 301-347.

Youngstown, strip except Types 303, 309, 316, 416, 501 and 502 and 34.25c on Type 301 C8.

METAL POWDERS

(Per pound, f.o.b. shipping point in ton lots for minus 100 mesh, except as otherwise noted)

	Cents
Sponge, iron:	
98+% Fe, annealed	18.00
Unannealed	14.50
Swedish, c.i.f. New York, in bags	8.85-9.95
Electrolytic, iron:	
Annealed 99.5% Fe	42.50
Unannealed 99+% Fe	36.50
Unannealed, 99+% Fe, minus 325 mesh	53.50
Powder, Flakes	48.50
Carbonyl, iron:	
97.9-99.8% size 5 to 10 microns	83.00-148.00
Aluminum:	
Carlots, freight allowed	31.00
Atomized, 500 lb drums, freight allowed	33.00
Antimony, 500 lb lots	71.00
Brass, 20-ton lots	28.25-32.00
Bronze, 10-ton lots	51.25-60.00
Phosphor-Copper, 20-ton lots	50.00
Copper:	
Electrolytic	37.25
Reduced	34.75
Lead	22.50
Magnesium	75.00-85.00
Manganese:	
Minus 100 mesh	57.00
Minus 35 mesh	52.00
Minus 200 mesh	62.00
Nickel, unannealed	86.00
Nickel-Silver 5-ton lots	44.50
Silicon	38.50
Solder (plus cost of metal)	8.50
Stainless, Steel, 302	83.00
Zinc, 10-ton lots	20.00-28.00
Tungsten	Dollars
Melting grade, 99% 60 to 200 mesh, 1000 lb and over	5.85
Less than 1000 lb	6.00
Molybdenum, 99.9% minus 200 mesh	3.24
Chromium, electrolytic 99% Cr min.	3.50



"...I urge employers to install the Payroll Savings Plan..."

M. B. FOLSOM
Treasurer, Eastman Kodak Company

"Continued saving will play an important part in protecting us against a renewal of inflation. The person who saves contributes to the nation's stability and to his family's security. He can now also obtain a higher return on his investment than he could in the past, because of the improvements in Defense Bonds now offered by the U.S. Treasury. I urge employers to install the Payroll Savings Plan wherever practicable, and employees to take advantage of such plan. By investing regularly in improved Defense Bonds, Americans serve their nation's interests as well as their own."

If your company does not have the Payroll Savings Plan

Please tear out this page and send it to the "Big Boss." Urge that he read, carefully, Mr. Folsom's superb summary of the Payroll Savings Plan and its benefits for employers, employees and our country.

The following figures should be particularly interesting to anyone not familiar with the wide adoption and the steady growth of the Payroll Savings Plan:

- 45,000 companies offer their employees the Payroll Savings Plan.
- since January 1, 1951, enrollment in The Plan has increased from 5,000,000 to 7,500,000.
- in some companies, more than 90% of the employees are systematic bond buyers—in literally thousands of other companies, employee participation runs 60%, 70%, 80%.
- payroll savers are putting aside $150,000,000 per month in U.S. Defense Bonds.
- the *cash value* of Series E Bonds held by individuals on December 31, 1951, amounted to $34.8 billion—$4.8 billion more than the cash value of Series E Bonds outstanding in August, 1945.

Phone, wire or write to Savings Bond Division, U.S. Treasury Department, Washington Building, Washington, D.C. Your State Director will show you how easy it is to install and maintain the Payroll Savings Plan.

If you have a Payroll Savings Plan, your State Director will show you how to build employee participation through a person-to-person canvass that puts an Application Blank in the hands of every employee. That's all you have to do—your employees will do the rest.

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STEEL
The Weekly Magazine of Metalworking

WAREHOUSE STEEL PRODUCTS

(Representative prices, cents per pound for delivery within switching limits, subject to extras.)

	SHEETS			STRIP		BARS			Standard Structural Shapes	PLATES	
	H.R. 18 Ga. & Heavier*	C.R.	Galv. 10 Ga.†	H.R.*	C.R.*	H.R. Rds.	C.F. Rds.	H.R. Alloy 4140††‡		Carbon	Floor
New York (city)	6.56	7.57	8.72	6.86		6.89	7.83‡	11.34	6.69	6.90	8.31
Jersey City (city)	6.35	7.27	8.47	6.75		6.59	7.53	9.54	6.39	6.60	8.01
Boston (city)	6.71	7.56	8.83	6.75		6.62	7.69‡	11.38	6.76	7.00	8.18
Boston (c/try)	6.51	7.36	8.63	6.55		6.42	7.49‡	11.18	6.56	6.80	7.98
Phila. (city)	6.36	7.38	8.55	6.70	8.55	6.67	7.70‡	11.04	6.42	6.49	7.62
Phila. (c/try)	6.11	7.13	8.30	6.45	8.30	6.42	7.45‡	10.79	6.17	6.24	7.36
Balt. (city)	6.01	7.37	8.62	6.62		6.61	7.62‡	11.37	6.67	6.67	7.90
Balt. (c/try)	5.81	7.17	8.42	6.42		6.41	7.42‡	11.17	6.47	6.47	7.70
Norfolk, Va.	7.60	...	...	...	...	6.44	8.45		7.25	6.64	7.33
Richmond, Va.	6.14	6.95	8.68	6.53		6.30	7.38	...	6.58	6.68	7.80
Wash. (w'hse)	6.31	7.61	8.90	6.89		6.90	7.78		6.93	6.95	8.17
Buffalo (del.)	6.00	6.85	8.61	6.41		6.10	7.15‡	11.27	6.28	6.50	7.87
Buffalo (w'hse)	5.80	6.65	8.41	6.21		5.90	6.95‡	11.07	6.08	6.30	7.67
Pitts. (w'hse)	5.80	6.65	8.00	5.97		5.83	6.90‡	10.65	5.95	6.00	7.18
Detroit (w'hse)	6.07	6.92	8.84	6.13	7.70-8.03	6.12	7.10‡	10.92	6.42	6.47	7.52
Cleveland (del.)	6.00	6.85	8.34	6.20		6.09	7.10‡	10.99	6.48	6.37	7.71
Cleve. (w'hse)	5.80	6.65	8.14	6.00		5.89	6.90‡	10.79	6.28	6.17	7.51
Cincin. (city)	6.28	6.87	8.62	6.29		6.28	7.31‡	11.22	6.57	6.62	7.75
Chicago (city)	6.00	6.85	8.20	6.03		6.03	7.00‡	10.85	6.15	6.20	7.38
Chicago (w'hse)	5.80	6.65	8.00	5.83		5.83	6.80‡	10.65	5.95	6.00	7.18
Milwau. (city)	6.17	7.02	8.37	6.20		6.20	7.27‡	11.02	6.32	6.37	7.55
Milwau. (c/try)	5.97	6.82	8.17	6.00		6.00	7.07‡	10.82	6.12	6.17	7.35
St. Louis (del.)	6.36	7.14	8.50	6.34		6.33	7.40‡	11.15	6.55	6.60	7.78
St. L. (w'hse)	6.10	6.94	8.00	6.14		6.13	7.20‡	10.95	6.35	6.40	7.58
Birm'hm. (city)	5.95	6.80	7.85‡	5.95		5.95	8.40	...	6.10	6.25	8.65
Birm'hm (w'hse)	5.80	6.65	7.70‡	5.80		5.80	8.40	...	5.95	6.10	8.65
Los Ang. (city)	6.80	8.65	9.85	6.95	11.40	6.80	8.80‡	12.25	6.84	6.91	9.67
L. A. (w'hse)	6.60	8.45	9.65	6.75	11.20	6.60	8.60‡	12.05	6.64	6.71	9.47
Seattle-Tacoma	7.37	9.97	9.90	7.64		7.14	9.62‡	10.90§	6.89	7.20	9.11
S. Fran. (w'hse)	6.90	8.20	9.60	6.75		6.65	8.70‡	12.05	6.50	6.75	8.90

*Prices do not include gage extras; † prices include gage and coating extras, except Birmingham (coating extra excluded), and Los Angeles (gage extra excluded); ‡ includes 25-cent special bar quality extra; § as rolled; †† as annealed. Base quantities, 2000 to 9999 lb except as noted. Cold-rolled strip, 2000 lb and over; cold-finished bars, 2000 lb and over; 2—500 to 1499 lb; 3—450 to 1499 lb; 4—1000 to 1999 lb.

Ores

Lake Superior Iron Ore

Gross ton, 51½% (natural), lower lake ports.

Old range bessemer	$9.45
Old range nonbessemer	9.30
Mesabi bessemer	9.20
Mesabi nonbessemer	9.05
High phosphorus	9.05

After adjustment for analysis, prices will be increased or decreased as the case may be for increases or decreases after Dec. 1, 1950 in applicable lake vessel rates, upper lake rail freights, dock handling charges and taxes thereon.

Eastern Local Iron Ore

Cents per unit del. E. Pa.

Foundry and basic 56-62% concentrates, contract	17.00

Foreign Iron Ore

Cents per unit, c.i.f. Atlantic ports.

Swedish basic, 60 to 68%	
Spot	nom.
Long-term contract	24.00
North African hematites (spot)	26.00-28.00
Brazilian iron ore, 67-69% (spot)	32.00

Tungsten Ore

Net ton unit, duty paid.

Foreign wolframite and scheelite, per net ton unit	$65.00
Domestic scheelite, mines	65.00

Manganese Ore

Manganese, 48% nearby, $1.18-1.22 per long ton unit, c.i.f. U. S. ports, duty for buyer's account; shipments against old contracts for 48% ore are being received from some sources at 85c-87c.

Chrome Ore

Gross ton, f.o.b. cars, New York, Philadelphia, Baltimore, Charleston, S. C., plus ocean freight differential for delivery to Portland, Oreg., or Tacoma, Wash.

Indian and African

48% 2.8:1	$39.00-42.00
48% 3:1	44.00-45.00
48% no ratio	30.00-32.00

South African Transvaal

44% no ratio	$27.00-28.00
48% no ratio	34.00-35.00

Brazilian

44% 2.5:1 lump	nom.

Domestic
(Rail nearest seller)

48% 3:1	$39.00

Molybdenum

Sulphide concentrates per lb. molybdenum content, mines	$1.00

CHROMIUM ALLOYS

High-Carbon Ferrochrome: Contract, c.l., lump, bulk, 24.75c per lb of contained Cr; c.l., packed, 25.65c; ton lot 26.50c, less ton 28.20c. Delivered. Spot, add 0.25c.

Low-Carbon Ferrochrome: (Cr 67-72%) Contract, carload, lump, bulk, max. 0.03% C, 17.60c per lb of contained Cr; 0.04% C, 35.50c; 0.06% C, 34.50c; 0.10% C, 34.00c; 0.15% C, 33.75c; 0.20% C, 33.50c; 0.50% C, 33.25c; 1% C, 33.00c; 1.50% C, 32.85c; 2% C, 32.75c. Carload packed add 1.1c, ton lot add 2.2c, less ton add 3.9c. Delivered. Spot, add 0.25c.

Foundry Ferrochrome, High Carbon: (Cr 62-66%, C 5-7%) Contract, c.l., 8 M x D, bulk, 26.25c per lb of contained Cr; C.l., packed 27.15c, ton 28.50c, less ton 30.25c. Delivered. Spot, add 0.25c.

Foundry Ferrochrome, Low Carbon: (Cr 50-54%, Si 2-3%, C 1.25% max.) Contract, carload, packed, 8 M x D, 18.35c per lb of alloy, ton lot 19.25c, less ton lot 20.4c, delivered. Spot, add 0.25c.

Low-Carbon Ferrochrome Silicon: (Cr 34-41%, Si 42-49%, C 0.05% max.) Contract, carload, lump, 4" x down and 2" x down, bulk, 25.75c per lb of contained chromium plus 12.4c per pound of contained silicon; 1" x down, bulk, 25.50c per pound of contained chromium plus 12.60c per pound of contained silicon. F.o.b. plant, freight allowed to destination.

Ferrochrome Silicon, No. 2: (Cr 36-39%, Si 26-39%, Al 2.9%, C 0.05% max.) 25.75c per lb of contained chromium plus 16.4c per lb of contained silicon plus aluminum 3" x down, delivered.

Chromium Metal: (Min 97% Cr and 1% Fe) Contract carload, 1" x D, packed, max 0.50% C grade, $1.12 per lb of contained chromium; ton lot $1.14, less ton $1.16. Delivered. Spot, add 5c.

SILICON ALLOYS

25-30% Ferrosilicon: Contract, carload, lump, bulk, 20.0c per lb of contained Si, packed 21.40c, ton lot 22.50c, f.o.b. Niagara Falls, freight not exceeding St. Louis rate allowed.

50% Ferrosilicon: Contract, carload, lump, bulk, 12.40c per lb of contained Si; carload, packed 14.0c, ton lot 15.45c, less ton 17.1c. Delivered. Spot, add 0.45c.

Low-Aluminum 50% Ferrosilicon: (Al 0.40% max.) Add 1.3c to 50% ferrosilicon prices.

75% Ferrosilicon: Contract, carload, lump, bulk, 14.3c per lb of contained Si; carload packed 15.6c, ton lot 16.75c, less ton 18.0c. Delivered. Spot, add 0.8c.

90-95% Ferrosilicon: Contract, carload, lump, bulk, 17.0c per lb of contained Si, carload packed 18.2c, ton lot 19.1c, less ton 20.2c. Delivered. Spot, add 0.25c.

Silicon Metal: (Min 97% Si and 1% max Fe) C.l. lump, bulk, regular 18.5c per lb of Si, c.l. packed 19.7c, ton lot 20.6c, less ton 21.6c. Add 0.5c for max. 0.10% calcium grade. Deduct 0.5c for max 2% Fe grade analyzing min 96% Si. Spot, add 0.25c.

Alsifer: (Approx. 20% Al, 40% Si, 40% Fe) Contract, basis f.o.b. Niagara Falls, N. Y., lump, carload, bulk, 9.90c per lb of alloy; ton lots packed 11.30c, 200 to 1999 lb 11.65c, smaller lots 12.15c.

VANADIUM ALLOYS

Ferrovanadium: Open-hearth Grade (V 35-55%, Si 8-12% max, C 3.75% max). Contract, any quantity, $3.10 per lb of contained V. Delivered. Spot, add 10c. **Crucible-Special Grades** (V 35-55%, Si 2-3.5% max, C 0.5-1% max), $3.20. **Primos and High Speed Grades** (V 35-55%, Si 1.50% max, C 0.20% max) $3.30.

Grainal: Vanadium Grainal No. 1, $1 per lb; No. 6, 68c; No. 79, 50c, freight allowed.

Vanadium Oxide: Contract, less carload lots $1.28 per lb contained V_2O_5, freight allowed. Spot, add 5c.

BORON ALLOYS

Ferroboron: (B 17.50% min, Si 1.50% max, Al 0.50% max, C 0.50% max). Contract, 100 lb or more, 1" x D, $1.20 per lb of alloy. Less than 100 lb $1.30. Delivered, spot, add 5c. F.o.b. Washington, Pa., prices, 100 lb and over, are as follows: Grade A (16-14% B) 75c per pound; Grade B (14-18% B) $1.20; Grade C (19% min B) $1.50.

Borosil: (3 to 4% B, 40 to 45% Si), $5.25 per lb contained B, delivered to destination.

Bortam: (B 1.5-1.9%), Ton lots, 45c per lb; smaller lots, 50c per lb.

Carbortam: (B 1 to 2%) contract, lump, carloads 9.50c per lb, f.o.b. Suspension Bridge, N. Y. freight allowed same as high-carbon ferrotitanium.

TUNGSTEN ALLOYS*

Ferrotungsten: (70-80%), 10,000 lb W or more, $4.85 per lb of contained W; 2000 lb W to 10,000 lb W, $4.95; less than 2000 lb W, $5.07, f.o.b. Niagara Falls, N. Y.

* Government ceiling prices, effective May 7, 1951, f.o.b. Niagara Falls, N. Y., basis.

NOTE: Current prices on manganese, titanium and "other ferroalloys" appeared on page 193 Nov. 10 issue; calcium, zirconium, briquetted alloys and refractories, page 157, Nov. 24.

CEILING PRICES, IRON AND STEEL SCRAP

Prices as set forth in Office of Price Stabilization ceiling price regulation No. 5, as amended Feb. 5, 1952

STEELMAKING SCRAP COMPOSITE

Nov. 27	$43.00
Nov. 20	43.00
Oct. 1952	43.00
Sept. 1952	45.00
Nov. 1947	40.42

Based on No. 1 heavy melting grade at Pittsburgh, Chicago and eastern Pennsylvania.

Basing point ceiling prices per gross ton from which maximum shipping prices are computed on scrap of dealer and industrial origin and from which ceiling prices and resulting delivered prices are computed on scrap of railroad origin:

Basing Point	Grade 1 No. 1 Bundles Dealer, Industrial	No. 1 Heavy Melt Railroad
Alabama City, Ala.	$39.00	$41.00
Ashland, Ky.	42.00	44.00
Atlanta, Ga.	39.00	41.00
Bethlehem, Pa.	42.00	44.00
Birmingham, Ala.	39.00	41.00
Brackenridge, Pa.	44.00	46.00
Buffalo, N. Y.	43.00	45.00
Butler, Pa.	44.00	46.00
Canton, O.	44.00	46.00
Chicago, Ill.	42.50	44.50
Cincinnati, O.	43.00	45.00
Claymont, Del.	42.50	44.50
Cleveland, O.	43.00	45.00
Coatesville, Pa.	42.50	44.50
Conshohocken, Pa.	42.50	44.50
Detroit, Mich.	41.50	43.50
Ecorse, Mich.	40.00	42.00
Harrisburg, Pa.	42.50	44.50
Houston, Tex.	37.00	39.00
Johnstown, Pa.	44.00	46.00
Kansas City, Mo.	39.00	41.00
Kokomo, Ind.	42.00	44.00
Los Angeles	35.00	37.00
Middletown, O.	44.00	46.00
Midland, Pa.	44.00	46.00
Minnequa, Colo.	38.00	40.00
Monessen, Pa.	44.00	46.00
Monessen, Pa.	42.50	44.50
Pittsburg, Calif.	35.00	37.00
Pittsburgh, Pa.	44.00	46.00
Portland, Oreg.	35.00	37.00
Portsmouth, O.	42.00	44.00
St. Louis, Mo.	41.00	43.00
San Francisco	35.00	37.00
Seattle, Wash.	35.00	37.00
Sharon, Pa.	44.00	46.00
Spartanburg, S. C.	42.00	44.00
Weirton, W. Va.	44.00	46.00
Youngstown, O.	44.00	46.00

Differentials from Base

Differentials per gross ton for other grades of dealer and industrial scrap:

O-H and Blast Furnace Grades

2 No. 1 Bushelling	Base
3 No. 1 Heavy Melting	$1.00
4 No. 2 Heavy Melting	1.00
5 No. 2 Bundles	1.00
6 Machine Shop Turnings	10.00
7 Mixed Borings and Short Turnings	6.00
8 Shoveling Turnings	.00
9 No. 2 Bushelling	4.00
10 Cast Iron Borings	6.00

Elec. Furnace and Fdry. Grades

11 Billet, Bloom & Forge Crops	7.50
12 Bar Crops & Plate	5.00
13 Cast Steel	5.00
14 Punchings & Plate Scrap	2.50
15 Electric Furnace Bundles	2.00
Cut Structurals & Plate	
16 3 feet and under	5.00
17 2 feet and under	6.00
18 1 foot and under	8.00
19 Briquetted Cast Iron Borings	Base
Foundry Steel	
20 2 feet and under	Base
21 1 foot and under	2.00
22 Springs and Crankshafts	1.00
23 Axle Ends Turnings	3.00
24 Heavy Turnings	1.00
25 Briquetted Turnings	Base
26 No. 1 Chemical Borings	3.00
27 No. 2 Chemical Borings	4.00
28 Wrought Iron	10.00
29 Shafting	10.00
31 Hot Tin & Terne Plated Bundles	10.00

Unprepared Grades

When compressed constitutes

32 No. 1 Bundles	6.00
33 No. 2 Bundles	9.00
34 Other than material suitable for hydraulic compression	15.00

Restrictions on Use

(1) Prices for Grades 11 and 23 may be charged only when shipped to a consumer directly from an industrial producer; otherwise ceiling prices shall not exceed prices established for grades 12 and 8, respectively.

(2) Prices established for Grades 26 and 27 may be charged only when sold for use for chemical or annealing purposes, and in the case of Grade 27 for briquetting and direct charge into an electric furnace; otherwise ceiling prices shall not exceed price established for Grade 10.

(3) Prices established for Grade 28 may be charged only when sold to a producer of wrought iron; otherwise ceiling price shall not exceed ceiling price for corresponding grade of basic open-hearth.

(4) Premiums for Grades 11 to 20 and 23 may be charged only when sold for use in electric and acid open-hearth furnaces or foundries of the basic O-H or blast furnace under NPA allocation or OPS authorization.

(5) Prices for Grade 29 may be charged only when sold for forging or refining purposes.

Differentials from Base

Differentials per gross ton above or below the price of Grade 1 (No. 1 railroad heavy melting steel) for other grades of railroad steel scrap:

2 No. 2 Heavy Melting Steel	$2.00
3 No. 2 Steel Wheel	Base
4 Hollow Bored Axles and axles with keyways between the wheelseats	Base
5 No. 1 Bushelling	3.00
6 No. 1 Turnings	3.00
7 No. 2 Turnings, Drill Rigs & Borings	12.00
8 No. 1 Cast Steel and small wheelcenters	6.00
9 Uncut Frogs, Switches	Base
10 Flues, Tubes & Pipes	8.00
11 Structural, Wrought Iron and/or steel, uncut	6.00
12 Destroyed Steel Cars	8.00
13 No. 1 Steel Scrap	9.50
14 Scrap Rails, Random Lengths	2.00
15 Rerolling Rails	7.00
Cut Rails	
16 3 feet and under	5.00
17 2 feet and under	6.00
18 1 foot and under	8.00
19 Cast Steel, No. 1	3.00
20 Uncut Tires	2.00
21 Cut Tires	5.00
Rolsters & Side Frames	
22 Uncut	Base
23 Cut	3.00
24 Angles, Splice Bars & Tie Plates	5.00
25 Solid Steel Axles	12.00
26 Steel Wheels, No. 3, oversize	Base
27 Steel Wheels, No. 3	5.00
28 Spring Steel	5.00
29 Couplers & Knuckles	5.00
30 Wrought Iron	8.00
31 Fireboxes	8.00
32 Boilers	6.00
33 No. 2 Sheet Scrap	13.00
34 Carsides, Doors, Car Ends, cut apart	6.00
35 Unassorted Iron & Steel	6.00
36 Unprepared scrap, not suitable for hydraulic compression	8.00

Preparation Charges

Charge per gross ton which may be charged for intrasteel preparation of any grade of steel scrap of dealer or industrial origin authorized by OPS are:

(1) For preparing into Grades No. 1, No. 4 or No. 2 $8.

(2) For hydraulically compressing: Grade No. 1 $6 per ton; Grade No. 5 $8.

(3) For crushing Grade No. 6 $4.

For preparing into:

4 Grade No. 25 $6.

5 Grade No. 19 $8.

6 Grades No. 12, No. 13, No. 14 No. 16, or No. 20 $10.

7 Grade No. 17 or No. 21 $11.

8 Grade No. 18 $12.

9 For hydraulically compressing: Grade No. 15 $8.

10 For preparing into Grade No. 28 $10.

Ceiling fees per gross ton which may be charged for intrasteel preparation of any grade of steel scrap of railroad origin shall be:

(1) For preparing into Grade No. 1 and Grade No. 2 $8.

(2) For hydraulically compressing: Grade No. 13 $6.

For preparing into:

3 Grade No. 16 $4.

4 Grade No. 17 $5.

5 Grade No. 18 $7.

6 Grade No. 21 $4.

7 Grade No. 23 $4.

Ceiling fees per gross ton which may be charged for intrasteel preparation of cast iron are limited to:

(1) For preparing Grade No. 3 into Grade No. 7 $9.

(2) For preparing Grade No. 3 into Grade No. 13 $7.

For preparing Grade No. 3 into Grade No. 14 $4.

CAST IRON SCRAP

Ceiling price per gross ton for following grades shall be f.o.b. shipping point:

Cast Iron:

1 No. 1 (Cupola)	$40.00
2 No. 2 (Charging Box)	47.00
3 No. 3 (Hvy. Breakable)	45.00
4 No. 4 (Burnt Cast)	41.00
5 Cast Iron Brake Shoes	41.00
6 Stove Plate	46.00
7 Clean Auto Cast	52.00
8 Unstripped Motor Blocks	43.00
9 Wheels, No. 1	47.00
10 Malleable	55.00
11 Drop broken machinery	52.00

OPEN MARKET

(Delivered prices include broker's commission.)

Birmingham

(Delivered)

Shoveling turnings	$30.00-32.00
Cast iron borings	30.00-32.00
No. 1 cupola cast	47.00-48.00
Stove plate	42.00
Charging box cast	39.00-40.00
Heavy breakable	36.00-37.00
Drop broken machinery	42.00-43.00
Unstripped motor blocks	35.00-36.00

Boston

(F.o.b. shipping point)

No. 1 cupola cast	44.00
Heavy breakable	36.00
Stove plate	34.00-35.00
Unstripped motor blocks	30.00

Buffalo

(Delivered)

No. 1 heavy melting	43.00
No. 2 heavy melting	43.00
No. 1 bushelling	44.00
No. 2 bundles	43.00
Machine shop turnings	34.00
Mixed borings turnings	38.00
Shoveling turnings	38.00
Cast iron borings	38.00
Short shoveling turnings	38.00
No. 1 cupola cast	45.50-46.50
No. 1 machinery cast	49.00-50.00

Chicago

(Delivered)

No. 2 heavy melting	42.50
No. 2 bundles	42.50
Machine shop turnings	30.50-32.50
Mixed borings, turnings	34.50-36.50
Shoveling turnings	34.50-36.50
Cast iron borings	34.50-36.50
No. 1 cupola cast	44.00-46.00
Charging box cast	41.00-43.00
Heavy breakable	38.00-40.00
Burnt cast	37.00-39.00
Cast iron brake shoes	39.00-41.00
Stove plate	41.00-43.00
Clean auto cast	46.00-48.00
Unstripped motor blocks	35.00-37.00
Malleable	46.00-48.00
Drop broken machinery	47.00-49.00

Cleveland

(Delivered)

No. 1 heavy melting	43.00
No. 2 heavy melting	43.00
No. 1 bundles	44.00
No. 2 bundles	43.00
Machine shop turnings	34.00
Mixed borings turnings	38.00
Shoveling turnings	38.00
Cast iron borings	38.00
(F.o.b. shipping point)	
No. 1 cupola	49.00
Charging box cast	47.00
Burnt cast	41.00
Stove plate	46.00
Clean auto cast	52.00
Unstripped motor blocks	43.00
Malleable	55.00
Drop broken machinery	52.00

Detroit

(F.o.b. shipping point)

No. 1 cupola cast	47.00-48.00
Heavy breakable	43.00-44.00
Clean auto cast	49.00-50.00
Unstripped motor blocks	40.00-41.00
Drop broken machinery	50.00-52.00
Charging box cast	44.00-45.00

Los Angeles

(Delivered)

No. 1 heavy melting	34.00
No. 2 heavy melting	31.00
No. 1 bundles	35.00
No. 2 bundles	29.00
No. 1 cupola cast	49.00
Machine shop turnings	14.00

New York

(Brokers buying prices)

No. 2 heavy melting	35.50
Mixed borings, turnings	29.50
Machine shop turnings	25.50
Cupola cast	42.00-43.00
Unstripped motor blocks	32.00-33.00

Philadelphia

No. 1 heavy melting	41.50
No. 2 heavy melting	41.50
No. 1 bundles	42.50
No. 2 bundles	41.50
No. 1 bushelling	42.50
Mixed borings, turnings	36.50
Machine shop turnings	32.50
Short shoveling turnings	36.50
No. 1 cupola cast	47.00-50.00
Unstripped motor blocks	40.00
Heavy breakable	45.00
Machinery cast	52.00
Charging box cast	47.00

(Ceiling price. †Nominal. ‡Shipping point. ††Delivered.)

Pittsburgh

(Delivered)

No. 2 heavy melting	44.00
No. 1 bundles	45.00
No. 2 bundles	44.00
Machine shop turnings	35.00
Shovel turnings	39.00
No. 1 cupola cast	48.50
Heavy breakable	45.00

(Ceiling price.

San Francisco

(Delivered)

No. 2 heavy melting	31.00
Machine shop turnings	14.00
No. 2 bundles	29.00
No. 1 cupola cast	44.00

Seattle

(F.o.b. shipping point)

No. 1 bundles	30.00
No. 1 cupola cast	41.00
Heavy breakable	36.00-38.00
Unstripped motor blocks	31.00

St. Louis

(Delivered)

No. 1 cupola	48.00
Unstripped motor blocks	38.00

Youngstown

(Delivered)

No. 2 heavy melting	43.00
No. 2 bundles	43.00
Machine shop turnings	34.00

HAMILTON, ONT.

(Delivered Prices)

Heavy Melt	$35.50
No. 1 Bundles	35.50
No. 2 Bundles	35.50
Mechanical Bundles	32.00
Mixed Steel Scrap	31.50
Mixed Borings, Turnings	32.50
Rails, Remelting	35.50
Rails, Rerolling	44.50
Bushelling	30.00
Bushelling new factory:	
Prep'd.	33.50
Unprep'd.	31.50
Short Steel Turnings	32.50
Cast Iron Grades†	
No. 1 Machinery Cast	50.00

(F.o.b. shipping point.

What do you do when your v-belts get loose or break?

1 **Leave the drive alone**

You get more slippage
- ...wasted power
- ...excessive belt wear
- ...uneven sheave wear
- ...less production

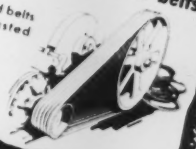
2 **Slide the motor back**

Tight belts get too tight

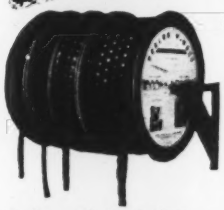
Life of belts and bearings is reduced

3 **Install a new set of belts**

Discarded belts mean wasted money



4 **Use VEELOS...**



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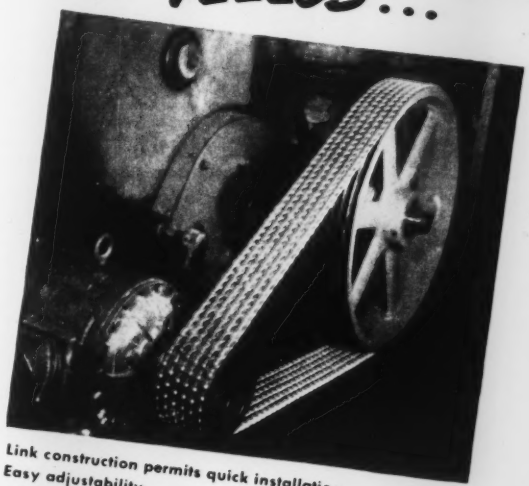

Link construction permits quick installation
Easy adjustability
...provides controlled tension on each belt
...eliminates loafers
Keeps your machines running for profitable production

VEELOS
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V-BELT

ADJUSTABLE TO ANY LENGTH • ADAPTABLE TO ANY DRIVE

Made in all widths in three types: regular, oil-proof, static conducting. Also double V in O, A and B. Packaged on reels in 100-foot lengths. Sales engineers in principal cities; over 350 distributors throughout the country. VEELOS is known as VEELINK outside the United States.

Advertisement

ELECTROMET Data Sheet

A Digest of the Production, Properties, and Uses of Steels and Other Metals

Published by Electro Metallurgical Company, a Division of Union Carbide and Carbon Corporation, 30 East 42nd Street, New York 17, N. Y. • In Canada: Electro Metallurgical Company of Canada, Limited, Welland, Ontario

CHROMIUM...key metal for strength, corrosion resistance, and heat resistance

Chromium is one of the most important alloying elements in iron and steel metallurgy since it markedly improves certain chemical and physical properties.

Increases Strength

The strength of steel is greatly increased by chromium because it retards the transformation of certain constituents during rapid cooling.

This makes it possible to obtain great depth of hardness in high-carbon steels, toughness in structural steel, and high strength and ductility in heavy sections. Chromium also increases resistance to steel by refining the grain of the steel.

Of all the alloying elements, chromium is probably the least expensive for increasing the tensile strength of steel. Additions of as little as 0.25 to 1.25 per cent chromium will increase the chill and hardness

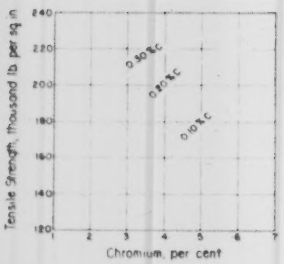


Fig. 1. Chromium increases the tensile strength of air-cooled steels of varying carbon content.

of the steel, as well as the tensile strength.

In copper, aluminum, and other nonferrous alloys, chromium provides increased strength also.

Imparts Corrosion Resistance

Commercially, chromium is added to steel and iron in amounts up to 30 per cent for the purpose of improving corrosion resistance.

In general, as the chromium content is increased with a given carbon content, the resistance of the steel to corrosive media becomes greater. The well-known "stainless" steels resist corrosion because substantial percentages (usually 12 per cent or more) of chromium are present.

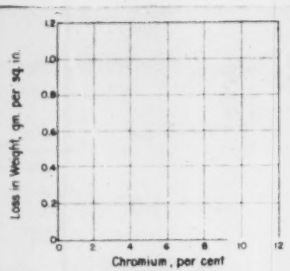


Fig. 2. Results of atmospheric corrosion tests on low-carbon steels of different chromium contents after 10 years of exposure to an industrial atmosphere.

Improves Heat Resistance

In both cast iron and steel, chromium provides good resistance to deterioration from heat. The use of chromium-alloyed iron and steel where high temperatures are encountered, for example, helps to prevent oxidation, which would ruin equipment. As little as 1 to 2 per cent chromium is added to cast iron to improve oxidation resistance and reduce growth of grate bars subject to high temperatures. Oxidation resistance improves progressively as the chromium is increased. Steels containing as little as 5 per cent chromium show good life at temperatures up to 1200 deg. F. For higher temperatures, appropriate steels of higher chromium content may be selected. Steels containing 25 to 28 per cent chromium give satisfactory service at temperatures up to 2100 deg. F.

Alloy cast irons with 15 to 30 per cent chromium are commonly used for applications requiring resistance to severe heat and abrasion.

In non-ferrous alloys, also, chromium is an important constituent for heat and corrosion resistance. It is used in the production of non-ferrous metal-cutting tools, chromium bronzes, and electrical resistance alloys.

Available Alloys

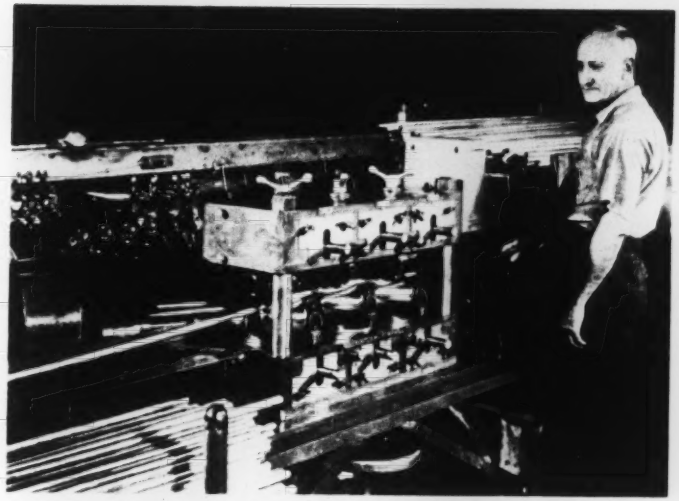
Chromium is produced by ELECTROMET in the forms listed below which are suitable for every use of the iron, steel, and non-ferrous metal industry.

"EM," "Electromet," and "SM" are trade-marks of Union Carbide and Carbon Corporation.

Alloys of Chromium and Their Uses

Low Carbon Ferrochrome	For production of corrosion- and heat-resistant steels, commonly known as the "stainless steels," as well as special high-temperature alloys in which a low carbon content is desirable.
High-Carbon Ferrochrome	For production of chromium-bearing steels that do not require low percentages of carbon. Also used for adding chromium to cast iron.
Nitrogen-Bearing Ferrochrome	For reducing grain size and improving physical properties of high-chromium steels.
"EM" Ferrochrome Silicon	Used in the production of stainless steels for adding chromium to the bath, and for reducing oxidized metals in the slag back into the bath.
"EM" Ferrosilicon-Chrome	Readily soluble material for making either furnace or ladle additions of chromium to steels.
"SM" Ferrochrome	Readily soluble material for making chromium additions to steel or cast iron in either the furnace or the ladle.
Foundry Ferrochrome	Especially for use in making readily soluble ladle additions of chromium to improve composition and properties of cast iron.
Chromium Metal	For use in non-ferrous chromium-bearing alloys, such as electrical resistance alloys, high-temperature and corrosion-resistant alloys, metal-cutting tools, chromium bronzes, and certain high-strength aluminum alloys.
"EM" Chromium Briquets	For adding chromium to cast iron in the cupola.

The Metal Market



Manual and Mechanical Means Straighten Tube

A rotary, guideless straightener made by Mackintosh-Hemphill Co., Pittsburgh, straightens 120 feet of tube per minute at the French Small Tube Branch of American Brass Co., Waterbury, Conn. Plant officials include manual work to secure desired straightness, as high production speeds on standard tube straightening machines do not guarantee a high quality of seamless brass and copper tube

Free market again soon for metals looks possible as government controls begin to crumble. With business good, metals users flood NPA with requests for supplemental allotments

PRICE AND WAGE control walls are crumbling and the seams of CMP and attendant materials controls are showing signs of strain. The first two may fall at any time; the latter will have to come apart more gradually.

A number of decontrol plans have been called up for inspection, the latest using certain carbon steel products as a trial balloon, then proceeding to all steel, copper, aluminum and other regulated materials in planned stages but without calendar timing. While industry may consider DPA's progress with decontrol about as fast as a glacier, that agency is at least meeting the problem head-on and, to DPA anyway, before the crisis has arisen.

Blameworthy—The same can't be said for OPS and WSB, which to many have a distinct aura of politics about them. Crises in these agencies, culminating last week in price boss Tighe Woods' resignation and the United Mine Workers case, could either end these agencies quickly or force a change in present policies.

Industry resentment against OPS is particularly keen because of what it believes to be a series of stopgap measures and arbitrary attitudes. The copper price fantasia is only one example. There OPS schizophrenia, says one industry man, has caused a maze of needless controls and actual loss of copper supplies (including nearly 15,000 tons of refined copper from scrap monthly) that compound the original damage.

No Help—Yet no corrective action is seen. Copper men can't even schedule a meeting with OPS. Another tip-off on maintenance of the precarious status quo: Notification of brass and wire mills that prices they can charge to cover extra costs of forging copper used won't be changed for three months.

Also undermining OPS is the joint congressional committee on defense production, which lauded stopping of inflation, yet didn't make express recommendations on the need for future price control. Prices of raw materials used in industry were off 3 per cent in October, further proof to many that OPS has outlived its usefulness.

Word to the Wise—Already large segments of industry are champing at the controls bit. Business is good in nearly all civilian lines and promises to be better. NPA desks are flooded with applications for supplemental allotments. Aluminum in particular is needed. Refrigerator and washing machine makers are again insistent. Sheet aluminum supplies won't start looking up till well into the second quarter. Copper wire demand is up again, indicating high operations in electrical industries. Nickel is a continuing headache; supply of 190,000 tons is hoped for by 1955, and there's little nondefense users can do but wait.

Lead Battle Goes On

The battle between London and New York for price leadership in lead is still going strong. Another round was won by London last week when U. S. producers were forced down another quarter-cent to the basis of 14.00 cents, New York, second such reduction in a week. The New York market had rallied briefly early in November to 14.50 cents, but now has lost back half that gain. Nevertheless, volume in November promises to be highest for the year, and long-term prospects are bright. Battery plate smelting charge now varies from $45 to $60, sign that a lot of scrap is being shaken loose. Full lead sheets and lead pipe are now quoted at 19.00 cents.

Zinc Outlook Bright

The next few quarters promise good sales, say zinc producers. No major price drops are in prospect if the British are careful in releasing stocks when that metal is freed for trading Jan. 2 in London. Galvanizers, die casters and brass mills all think they'll be going strong next year. Zinc is priced well below 15 cents, where it begins to lose its market to competitive materials.

Zinc application for galvanic or cathodic protection of underground pipe is under study. The application is similar to the much-discussed use of magnesium anodes to protect ship bottoms from corrosion. In pipe applications, zinc researchers find that soil potential is such that zinc is a better and cheaper means of achieving sacrificial corrosion than magnesium.

NONFERROUS METALS

(Cents per pound, carlots, except as otherwise noted)

Primary Metals

Copper: Electrolytic, 24.50c, Conn. Valley; Lake 24.50c, delivered.

Brass Ingots: 85-5-5-5 (No. 115), 27.25c; 80-10-10 (No. 305), 27.50c; 88-10-2 (No. 210), 28.25c; 77-20-2-1 (No. 405), 28.25c.

Zinc: Prime western, 12.50c; brass special, 12.75c; intermediate, 13.00c; East St. Louis, high grade 13.00c, delivered.

Lead: Common, 13.80c; chemical, 13.90c; corroding, 14.00c, St. Louis.

Primary Aluminum: 99+% plus, ingots 20.00c, pigs 19.00c. Base prices for 10,000 lb and over. Freight allowed on 500 lb or more but not in excess of rate applicable to 10,000 lb.

Secondary Aluminum: Piston alloys 20.50c; No. 12 foundry alloy, No. 2 grade, 19.50c; sheet, bearing alloys, remelt ingots, granulated or shot, grade 1, 18.50c; grade 2, 18.00c; grade 3, 18.50; grade 4, 18.50.

Magnesium: Commercial sand cast, ingots, stand. and regular, 30.00c; die cast, 24.50c, f.o.b. Freeport, Tex.

Tin: Grade A, prompt 121.00c.

Antimony: American, refinery, and over, but not meeting specifications below, 34.50c; wrought and over (various), 0.05% max. other impur., over 0.1% max. arsenic, f.o.b. Laredo, Tex. for bulk shipments.

Nickel: Electrolytic, cathodes, 99.9%, base sizes, f.o.b. refinery, unpacked, 56.50c; 99.5% to 99.9%, 56.50c; 99% to 99.5%, 56.50c; 99% to 99.5%, 56.50c; 99% to 99.5

Tin Plate . . .

Tin Plate Prices, Page 156

Cleveland—Whether all canmakers will avail themselves of a 4 per cent increase in their selling prices permitted by the Office of Price Stabilization is uncertain. Some makers, it is said, already have ceiling prices high enough above their selling prices to absorb the new increase. In general, competition sets the price level in the can market. The increase permitted by OPS, effective Nov. 25, is to offset higher steel and other costs. The canmakers are given two optional methods of adjusting their prices if they so desire. Under one method, they can increase quotations a flat 4 per cent above their highest selling prices during first half of 1952. Under the second method, they can raise prices 2.3 per cent above those in the first half of 1952 and add another 1.7 per cent as a pass-through for increased steel costs.

Sheets, Strip . . .

Sheet and Strip Prices, Page 155 & 156

Cleveland—The sheet mills are under pressure for deliveries and there is no sign of any early easing in demand. Producers are entertaining a heavy volume of business for first quarter from manufacturers of civilian goods. Order books are filled for first quarter and, except for top-rated business, there is little prospect of consumers placing additional tonnage for the period. This, in part, is due to the fact carryover from fourth quarter will be large, and this carryover commands rolling precedence over new business.

Boston—Slight easing in most flat-rolled products finds many consumers with small inventories. Demand is sustained but more tonnage is now rolling in from mills on fourth quarter orders. Galvanized sheets are available in larger volume, also straight chromium stainless.

New York—Sheet demand is holding up surprisingly well with most producers having little additional tonnage to offer non-defense consumers for first quarter. Some mills declare flatly they haven't any capacity left for hot and cold-rolled sheets, nor for galvanized. Only in certain specialties such as straight chromium steels and high silicon sheets, do they appear to have any open rolling time.

Philadelphia—Demand for hot and cold-rolled sheets is well sustained but there appears to be a little easing in the coated products. There are no cancellations, however, or requests for shipment delays. Enameling stock is in short supply.

Pittsburgh—Supply of sheet and strip continues tight, with appliance manufacturers taking all they can get.

Chicago—Save for the farm equipment industry, virtually every field of manufacture envisions rising production in first half next year. Demand for sheets in nearly every category reflects present attitudes and has sheet makers baffled.

San Francisco—Sheets are not offered on the market in anywhere near the supply needed to satisfy demand.

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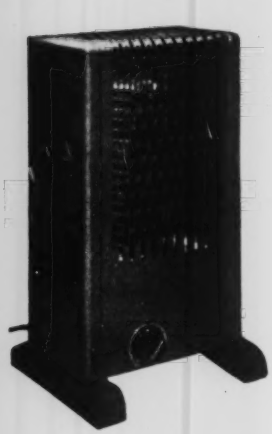

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Steel Bars . . .

Bar Prices, Page 155

Boston — Although supplemental hot-rolled carbon bar allotments, first quarter, are confined largely to sizes 1-in. and under, most mills have no open space for the period. Some fourth quarter tickets for January-February found no space. There are limited openings for cold-finished carbon bars next quarter. Slow buying by textile machinery builders accounts for this.

New York — Hot carbon bar producers generally have little open capacity left in first quarter for further nondefense tonnage. Recently noted increase in first quarter tickets for hot bars, 1-in. and under, is helping consumers a little.

Pittsburgh — Supply of steel bars has tightened somewhat. Cold-finished bar producers expect steady demand throughout 1953.

Cleveland — Slightly easier supply situation is reported developing in alloy bars. In general, however, demand continues to outstrip supply by a wide margin with sellers booked up well through first quarter. Cold-finished bars are in short supply, this largely reflecting the scarcity of hot-rolled material. Indications are military requirements for large and medium sized bars will continue strong well into 1953.

Los Angeles — Large diameter rounds are expected to be in short supply throughout 1953. With completion of additional barmaking facilities now under construction, improved supplies may be available for civilian requirements by the third quarter, 1953.

Seattle — Sierra Drawn Steel Corp. of the Northwest has begun operations at its newly completed plant. Cold-drawn bars are being produced. Rolling mills in the area are reducing their order backlogs with operations at capacity.

Plates . . .

Plate Prices, Page 155

New York — While some narrow strip plate, 25½ in. and less, is still being offered for delivery in February by one eastern mill, little additional sheared plate is available for non-defense work in first quarter at any mill. Such plate as is to be had is for delivery in March. Most producers are now booked up solidly throughout the entire first quarter on commercial tonnage, although at least one has not opened books for March.

Boston — Except for heavier sizes, carbon plates are easing. In some cases tonnage originally scheduled for February will go forward to January. Low alloy plates are taken through first quarter including military set-asides. Floor plate buying has eased with distributors, but with no tonnage available at mill levels before February. In heavier sizes substantial ratio of orders is covered by high ratings, bulk of weldment demand being carried along by Z-2 orders.

Philadelphia — Silicon plates, particularly heavy gages, are in strong demand for atomic energy and Navy requirements. In addition, there is considerable inquiry from fabricators of high-pressure boilers and vessels.

Chicago — Plate fabricators are op-

erating at capacity but with difficulty because steel inventories are insecure. Plate users think they might be better off under some form of decontrol, providing deliveries to the military and top-rated programs are kept in close balance with actual needs.

Seattle — Major project involving plates in this area is the Haines, Alaska, pipeline, tentative bid opening scheduled Jan. 1, by the Alaska District, U. S. Engineer. Quantities are unstated but the project is the most important pending in the plate market.

Tubular Goods . . .

Tubular Goods Prices, Page 159

Boston—While steel pipe distributors are taking allotments in full, most are not selling in that volume and inventories are building up with better balance. This applies only to buttweld. Seamless remains one of the tightest of steel products because of heavy oil country demand.

Seattle—The cast iron pipe market is seasonally slow but more activity is expected at the turn of the year. Auburn, Wash., will receive bids in two weeks for an unstated quantity of water pipe and bids have been called for cast iron pipe or alternatives by White Salmon, Wash., and Arlington, Oreg.

Structural Shapes . . .

Structural Shape Prices, Page 155

New York—Public work dominates structural activity, bridge work primarily, with little in the way of private construction. Industrial building in this district has long since passed its peak and now is comprised of small scattered jobs. Government restrictions on offices, stores and large apartment projects are contributing to inactivity but some leading fabricators doubt there will be much of a spurt in commercial construction even when restrictions are lifted. Costs are too high, they assert, to make such construction profitable.

Boston — Structural fabricating shops are promising earlier shipment on private contracts of medium tonnage; although a considerable volume of fourth quarter tickets withered on the vine due to lack of mill space. Paradoxically, first quarter authorizations are easier to obtain. Plain structural tonnage will be tight through first quarter, but supply is expected to get in balance during the second quarter.

Pittsburgh—Structural fabricators are eyeing mill books for second quarter, soon to be opened. Their chances are not too good for getting much more than their allocations.

Seattle — Within the next four months, bids will be opened for Alaska military construction totaling $198 million, according to tabulations of Alaska District, Corps of Engineers. The list includes 198 projects as follows: Ft. Richardson, 31, $29,081,000; Ladd field, 34, $25 million; Eielson, 26, $30 million; Big Delta, 53, $23.256 million; Whittier, 12, $11.576 million; Kenai, 11, $2.612 million; Haines, POL pipeline, $28.434 million; Elmendorf air base, $50 mil-

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Right—Entrance to offices of Fairfield's new plant in Lafayette, Indiana
Above—Hobbing Spur Gear.

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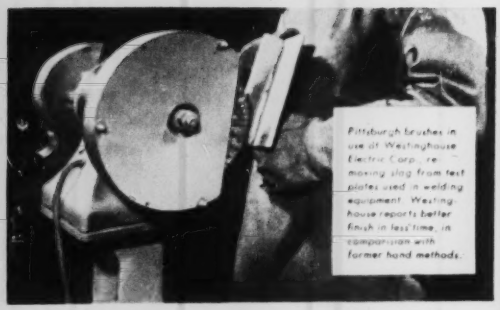
Pittsburgh brushes in use at Westinghouse Electric Corp., removing slag from test plates used in welding equipment. Westinghouse reports better finish in less time, in comparison with former hand methods.

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Removal of imbedded slag in welding test plates formerly was done by hand at the Westinghouse Electric Corp., Trafford, Pa., using a wire brush and welder's hammer. Pittsburgh brushes, powered by a direct drive ½ h.p. motor, now remove more slag in less time, and produce a better finish. In addition, Westinghouse reports their Pittsburgh brushes "stand up better than average in use."

Complete cleaning of dried concrete, rust and scale from steel frames used in concrete forming is essential prior to re-using the forms. Pittsburgh wire brushes were installed at the Universal Form Clamp Co., Chicago. Working on a conveyor-fed machine, the Pittsburgh brushes now remove all foreign material at a rate of 50 pieces per hour, replacing former laborious hand brushing and scraping.

De-scaling preheated bar stock at the Dominion Forge & Stamping Co., Ltd., Canada, was formerly done by hand scraping. This never did a complete job, and inclusions resulted which produced defective forgings. Pittsburgh brushes, on specially-designed machines, now do the job, and have "increased efficiency, decreased the amount of scrap, improved work quality, and saved labor."

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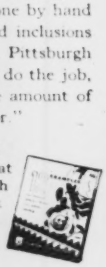

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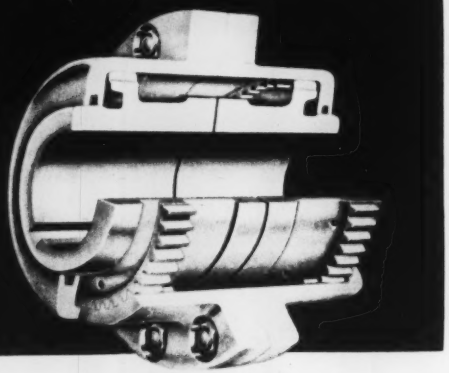

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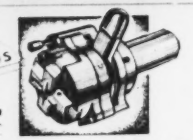

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lion plus. Projects involve warehouses, storage facilities, refrigerated units, ammunition storage, fuel storage, shops, barracks and other facilities. Unstated quantities of shapes, reinforcing and plates are involved.

Seattle—Local fabricators are seeking new business with their order backlogs melting away. Current interest centers in award of 1300 tons of shapes for the Hanford project, bids in, and 1400 tons for the Snohomish river bridge, general contract placed.

Wire . . .

Wire Prices, Page 157

Boston—Without heavy impact of supplemental first quarter allotments for carbon steel drawn wire, mill schedules on some sizes and grades are nearly filled for that period. This is notably true of coarser sizes, but with most finer sizes lagging. On the whole, buying is slightly more active for first quarter with consumers more concerned as to deliveries, especially for automotive use. Mattress spring wire volume is substantially heavier.

Semifinished Steel . . .

Semifinished Prices, Page 155

Pittsburgh—United States Steel Co. poured its billionth ton of steel Nov. 26, the occasion being marked by a ceremony at the company's open-hearth furnace No. 56 at the Homestead District works. It took 51 years, 7 months and 25 days for the company's mills to become the first in history to reach a billion tons.

Detroit—Blooming mills of the Ford Motor Co. set a new record Nov. 23, rolling 5013 tons. Previous record for this operation was 4857 tons.

Metallurgical Coke . . .

Metallurgical Coke Prices, Page 159

Philadelphia—Oven foundry coke has been advanced here $1.25 per ton to $23.95 ovens, retroactive to Oct. 13. In Connecticut, where prices are quoted on a delivered basis, a similar advance has been announced, effective Dec. 1. At New Haven, for instance, the new delivered price on foundry coke will be $24.20. In both instances, industrial coke is being advanced $1. No changes had been announced up to presstime for Kearney, N. J., or Swedeland, Pa., ovens, nor had new schedules been named for New England, other than Connecticut. Trade view is that similar advances will be announced at these points, but effective dates may vary.

Cleveland—It was rumored in the trade here last week that oven coke prices will be advanced $1.50 per ton effective Dec. 1. Coke sellers admit an increase is under consideration but because of difficulty in translating the latest Office of Price Stabilization instructions into terms of what is really meant in the way of higher prices they are withholding announcements pending final decisions by the separate company managements.

Chicago—Oven foundry coke prices are being advanced $1.50 a ton as result of OPS relief for higher coal prices. Some producers made the increase effective Nov. 24 and others Dec. 1.

Scrap . . .

Scrap Prices, Page 162

Washington—Stocks of iron and steel scrap held by consumers totaled 6,274,063 gross tons at the end of August, according to latest data of the Bureau of Mines. Purchased scrap stocks were 5,043,204 tons, largest since Sept. 30, 1953. Home scrap stocks were 1,230,859 tons. Consumption during August amounted to 2,738,593 tons of purchased scrap and 2,732,103 tons of home scrap.

New York—Scrap demand is not too pressing. This applies to the open-hearth grades as well as to some cast grades, which definitely are in light demand. Particularly is this true of unstripped motor blocks on which even the lower prices of a week ago are largely nominal. Also No. 1 cupola cast is sluggish.

Buffalo—Some 15,000 to 20,000 tons of steelmaking scrap were placed last week at ceiling levels. Mill yards are bulging with reserve stocks, however, and large quantities of scrap continue to arrive by water. About 14,000 tons came in by canal barge and lake carrier last week. Efforts of consumers to buy cast scrap $2 to $3 below ceiling have been futile.

Philadelphia—District consumers of open-hearth scrap are pushing a little harder for tonnage. In several instances inventories are down to two and three weeks. With winter ahead there is an effort to increase stocks by going a little further afield for supplies. Cast grades are easy with No. 1 cupola holding at $47 to $50 delivered.

Pittsburgh—Scrap is moving to the steel mills at ceiling prices. If controls are removed prices on specialty items are expected to shoot up. No scramble exists at present for low phos grades. Cupola cast is weak with isolated sales below ceiling.

Cleveland—With steelmaking operations booming along at capacity pace the mills continue to take in scrap steadily. This is especially true of better quality material. As a result of the steady flow, dealers' yards are fairly clean of material. Mill stocks, however, are reported running from 45 to 60 days' supplies, which is considered comfortable and adequate to support high-level production over the winter months. The cast grades continue to move sluggishly with foundry operations still lagging. Prices on steel grades are holding at ceiling but cast grades are soft. Trend of the market after price controls are lifted, expected in the spring, is a matter for considerable speculation in the scrap trade at present.

Detroit—Steel mills are continuing to push for delivery of select grades. Blast furnace material, however, has been in limited demand for the last week or so. Foundry scrap enjoys sporadic demand, some items commanding close to ceiling.

Chicago—Little change in the scrap market is expected the rest of this year. Steelmaking grades are steady with mills taking tonnage regularly under contract. Inventories are substantial. Turnings and borings are sagging. Further weakness is noted in cast grades.

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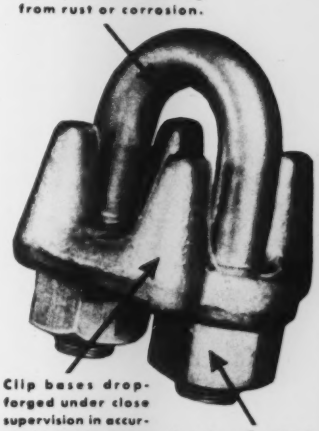

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ing scrap are so low dealers find it harder to buy than sell. Most mills have comfortable stockpiles and are buying sparingly. Cast scrap remains inert. Unstrapped motor blocks are quoted $38 but are subject to dickering.

Birmingham—Although district steelmaking operations are booming along at 106.5 per cent of capacity the scrap market here is slow. Substantial tonnage is moving to other areas from this district.

San Francisco—The scrap market maintained its equilibrium last week, undisturbed by any outstanding developments. Supplies are flowing steadily, being equal to the melt in all cases.

Seattle—Scrap supplies and demand about balance. Consumption is at high level. Inventories are not showing much increase but there is no concern for next quarter.

Iron Ore . . .

Iron Ore Prices, Page 161

Washington—Iron ore imported into the U. S. for consumption in July totaled 724,518 gross tons, bringing imports up to Aug. 1 to 4,923,784 tons. Imports to date this year are: Sweden, 1,228,299 tons; Chile, 1,133,925; Venezuela, 830,927; Canada, 676,611; Brazil, 449,033; Liberia, 299,107; British W. Africa, 151,600; Algeria, 66,008; Mexico, 58,451; Tunisia, 9500; Cuba, 8565; Union of S. Africa, 4800; Spain, 4600; Iran, 1472; United Kingdom, 576 tons.

Pig Iron . . .

Pig Iron Prices, Page 151

Cleveland—Pig iron suppliers are disposing of all their production but demand pressure from the foundries is not as strong as it was some months back. This goes even for the larger shops on defense work. Foundry inventories, as a general thing, are reported in line with the government's regulation restricting stocks to 30 days.

Important development in the merchant iron trade in this district this past week was announcement of plans for the building of a new blast furnace at the Central Furnaces & Docks Plant here of the American Steel & Wire Division, U. S. Steel Co. The new stack will be of 1350 tons daily capacity. At present there are two furnaces at this plant with combined annual capacity of 530,000 tons of pig iron.

New York—Pig iron supplies are adequate. Most district foundries are not operating full tilt and further, under governmental regulations, inventories are limited to 30 days. Pig iron producers are doing more selling now than at any time in months.

Philadelphia—Foundry pig iron is moving freely with supply sufficient for requirements. Only in basic iron does any special supply stringency appear and, even in this grade, tension is less than it was some time back.

Chicago—Pig iron supply and demand are in precarious balance currently. Combination of influences could easily tip the scale either way.

Birmingham—Production was resumed last week at the plant of the Woodward Iron Co. after a 7-day shutdown due to strike of transportation department employees.

Warehouse . . .

Warehouse Prices, Page 161

Buffalo—Order volume entertained by local steel warehouses is reported heavy but distributors' unbalanced stocks handicap them in filling all the needs coming to them. Large bars are in particularly short supply. On a recent press tour of three local warehouses, conducted under sponsorship of the local chapter of the American Steel Warehouse Association, it was pointed out procurement rather than sales is the chief problem of warehouse operators under present conditions. The warehouses toured were: Beals, McCarthy & Rogers, Inc., Wheelock Lovejoy & Co., Inc., and Brace-Mueller-Huntley, Inc.

Boston—Larger sizes of plates and bars are in short supply, but in lighter ranges inventories are building up. Slight headway in sheet stocks also is noted. More foreign steel is being sold, price for imported steel having narrowed to the point where standard domestic warehouse prices are charged.

Cleveland—While local warehouses are receiving shipments from the mills steadily, their inventories continue highly unbalanced. Large-size bars,

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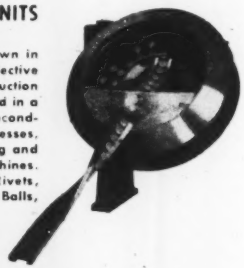

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heavy plates and structurals are more acutely short than other items. However, demand pressure is strong all down the line, even for the light, flat-rolled items.

Philadelphia — Warehouse bookings were off slightly in November, even on a daily basis. Indications are December tonnage will show further decline seasonally.

Chicago — Prospect that many types of steel may continue tight into second quarter next year appears to be a factor in maintaining current strong warehouse demand.

Pittsburgh — Warehouses are plagued with unbalanced stocks. Sheets and wide flange beams are available, but not always in sizes for which greatest demand exists.

Seattle — Warehouse demand is strong except for seasonal items. The over-all situation is healthy but distributors have been unable to increase inventories. Critical items are still scarce but deliveries are showing some improvement.

Ferroalloys . . .

Ferroalloy Prices, Page 161

Washington — Ceiling price increases were granted by the Office of Price Stabilization to producers of ferrochrome, chromium metal and other chromium products. The action is designed to encourage increased production. The OPS order boosts ceiling prices three cents per pound of chromium contained in high-carbon metal products and four cents per pound contained in low-carbon items.

Rails, Cars . . .

Track Material Prices, Page 157

San Francisco — The steel strike was more disruptive of freight car builders' schedules than first realized and delivery of 300 drop-bottom gondola cars, 100 mill-type gondola cars and 100 selective-dump-hopper cars, ordered by Western Pacific railroad June 1, now is not expected until the second or third quarter of 1953.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

2015 tons, manufacturing building, General Electric Co., Louisville, through Turner Construction Co., to Ingalls Iron Works, Birmingham.

635 tons, building, St. Regis Paper Co., Providence, R. I., through Turner Construction Co., to White Plains Iron Works, White Plains, N. Y.

300 tons, plant addition, Welbilt Stove Co., Maspeth, N. Y., to Simmons-Holland & Sons, Brooklyn, N. Y.

200 tons, laboratory, East Hartford, Conn., through Associated Construction Co., to Standard Structural Steel Co., Hartford, Conn.

145 tons, building, New York Life Insurance Co., New Providence, N. J., to H. R. Gehler.

135 tons, state highway bridge, Albany county, New York, to Bethlehem Steel Co., Bethlehem, Pa.

100 tons, two leaf lock gates, Willamette Falls lock, to Gunderson Bros. Engineering Corp., Portland, Oreg.

100 tons, receiving and shipping building, Scovill Mfg. Co., Waterbury, Conn., to Berlin Construction Co., Berlin, Conn.

STRUCTURAL STEEL PENDING

1500 tons, pier and shed, Port of Boston Authority, Boston; bids Dec. 17.

900 tons, state pier building, Fall River, Mass.; bids Dec. 23.

200 tons, Lookout Point powerhouse, Willamette river, Oregon; general award made by U. S. Engineer, Portland, Oreg.

124 tons, state bridge work, Cumberland county, Pa.; bids Dec. 19.

REINFORCING BARS . . .

REINFORCING BARS PLACED

720 tons, Washington state Snohomish river bridge, to Bethlehem Pacific Coast Steel Corp., Seattle.

225 tons, Washington state bridge, Spokane, to Union Iron Works, Spokane, Wash.

REINFORCING BARS PENDING

1000 tons, Adak Field barracks, Washington state, Navy project; bids in Nov. 26.

340 tons, plus 35 tons miscellaneous steel, pump plant structures, Hanford project, P. S. Lord Mechanical Contractors, Portland, Oreg.; low $1,398,000.

300 tons plus administration building, dormitory etc., Elelson field, Alaska; base award to Kuney-Johnson Co., Seattle; low $2,515,233.

135 tons, highway mesh, New Haven-East Haven, Conn.; bids Dec. 8, Hartford, Conn.

100 tons, Washington state highway projects; bids in.

PLATES . . .

PLATES PENDING

500 tons, penstocks Lookout Point, Willamette river, Oregon; general joint contract to Morrison-Knudsen, P. Kiewit Sons Co. and Macco Corp.; low $2,987,374 by U. S. Engineer, Portland, Oreg.; bids opened Nov. 5.

PIPE . . .

CAST IRON PIPE PLACED

165 tons, 36-inch water main, state highway department, Bronx county, New York, through Slattery Contracting Co., New York, to American Locomotive Co., that city.

RAILS, CARS . . .

LOCOMOTIVES PLACED

Bessemer & Lake Erie, thirteen 1500-hp diesel units, to Electro-Motive Division, General Motors Corp., La Grange, Ill.

Chesapeake & Ohio, sixteen 1500-hp general purpose diesel units, to Electro-Motive Division, General Motors Corp., La Grange, Ill.

Clinchfield, fourteen 1500-hp diesel units to the Electro-Motive Division, General Motors Corp., La Grange, Ill.

Lackawanna, ten 2400-hp diesel units, to Beloit, Wis., works of Fairbanks, Morse & Co., Chicago.

Monongahela, seven 1200-hp diesel switching units, to Baldwin-Lima-Hamilton Corp., Eddystone, Pa.

Spokane, Portland & Seattle, four 1600-hp road-switching diesel units to American Locomotive-General Electric Companies, Schenectady, N. Y., four 1500-hp passenger diesel units to Electro-Motive Division, General Motors Corp., La Grange, Ill.

Wabash, 30 diesel units, awarded as follows: two 3000-hp freight locomotives, each consisting of two units, two 2250-hp passenger units, five 1500-hp road switchers, three 1200-hp and five 800-hp switchers, to Electro-Motive Division, General Motors Corp., La Grange, Ill.; three 1000-hp switchers to American Locomotive-General Electric Companies, Schenectady, N. Y.; three 1200-hp switchers, to Fairbanks, Morse & Co., Chicago; three 1200-hp switchers, to Baldwin-Lima-Hamilton Corp., Eddystone, Pa., and one freight locomotive, consisting of two units for service in Canada to General Motors Diesel, Ltd., London, Ont.

RAILROAD CARS PLACED

Baltimore & Ohio, three rail-diesel self-propelled passenger cars to Budd Co., Philadelphia.

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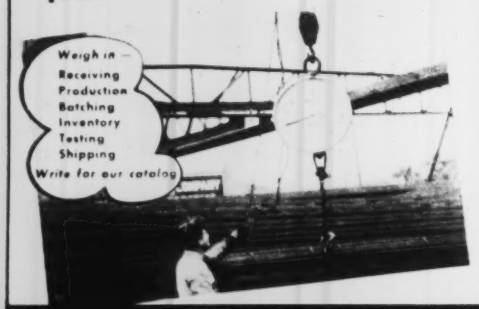

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Here and There in Metalworking . . .

CONSTRUCTION—ENTERPRISE—ORGANIZATIONAL CHANGES

Lindberg Steel Treating Expands

Lindberg Steel Treating Co. expands its facilities with the formal opening of a plant located at 2910 Sunol Dr., Los Angeles. The new quarters triple capacity of the company's former plant. More than 30 furnaces and heat-treating units are being installed to permit the company to handle a wide range of specialized work, as well as standard production heat treating jobs. This equipment includes controlled atmosphere hardening furnaces, tempering furnaces, hydrogen annealing furnaces, as well as equipment for Malcomizing, nitriding, induction hardening, flame hardening, sand blasting and liquid honing. The plant also will have special furnace equipment for the heat treatment of aircraft work, such as aluminum castings and shapes.

Metal Trim Co. Inc. Organized

Paul Donham, consulting management engineer of Toledo, O., organized Metal Trim Co. Inc., Winchester, Ind. The company purchased the assets of a partnership which manufactures decorative metal trim parts for the household appliance industry. The company plans to expand its manufacturing activities to other major appliance lines.

Harris Gets $4 Million Contract

Frederic R. Harris Inc., New York, a consulting engineering firm, was engaged by the New Jersey Highway Authority to design and supervise construction of a $4 million section of the Garden State parkway. The project will include several bridges and two railroad underpasses.

Heating Equipment Firms To Merge

Consolidation of U. S. Machine Corp., Lebanon, Ind., with Stewart-Warner Corp., Chicago, is proposed. The plan will be submitted to stockholders for approval. U. S. Machine produces oil, gas and coal-burning heating equipment while Stewart-Warner's products include heating equipment for automotive and aviation use, as well as home heating units.

Dow Licenses United Saran Corp.

Dow Chemical International Ltd., Midland, Mich., granted a manufacturing license to United Saran Corp. Ltd., Rehovoth, Israel, for the production of Saran, a Dow-developed plastic. The plant in Rehovoth is nearing completion and machinery for it will be shipped from the United States in the near future. Joseph Jacobson is managing director of the new corporation.

General Petroleum Plans Refinery

General Petroleum Corp., Los Angeles, will build a $35 million refinery at Ferndale, Wash. It is scheduled for completion in the fall of 1954.

United Chromium Names Distributor

United Chromium Inc., New York, appointed S. A. Williams Co., Baltimore, as distributor of its protective coatings in that area.

Scrap Brokerage Firm Organized

Marcus E. Borinstein, former vice president of James Flett Organization Inc., and more recently of LaSalle Trading Co., scrap broker, Chicago, organized the M. E. Borinstein Co. with offices at 188 W. Randolph St., Chicago. The company will handle iron and steel scrap, stainless steel scrap, metal scrap and structural steel.

National Malleable To Build Foundry

National Malleable & Steel Castings Co., Cleveland, plans a $2 million expansion of its Capitol Foundry Co.'s facilities near Phoenix, Ariz. A new foundry is being constructed, scheduled for completion in 1953, which will produce cast steel grinding balls for the mining industry in that region. The new program calls for adding a second foundry to produce a general line of castings for the mining industry.

Studebaker Expands South Bend Plant

Studebaker Corp., South Bend, Ind., expanded its plant facilities in that city. The company erected a $600,000 building which is being used for boxing and shipping "knocked down" passenger cars and trucks to overseas markets.

Diesel Engine Makers Elect Officers

A. W. McKinney, executive vice president, National Supply Co., Pittsburgh, was elected president of Diesel Engine Manufacturers Association, Chicago. Other officers elected for 1953 are: Walter A. Rentschler, vice president, Baldwin - Lima - Hamilton Corp., Philadelphia, and William E. Butts, president, Enterprise Engine & Machinery Co., San Francisco, vice presidents; Robert H. Morse Jr., president, Fairbanks, Morse & Co., Chicago, treasurer; and Harvey T.

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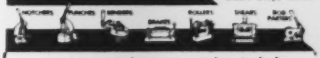

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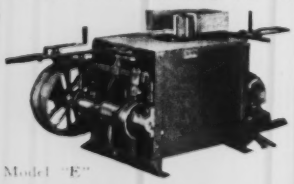

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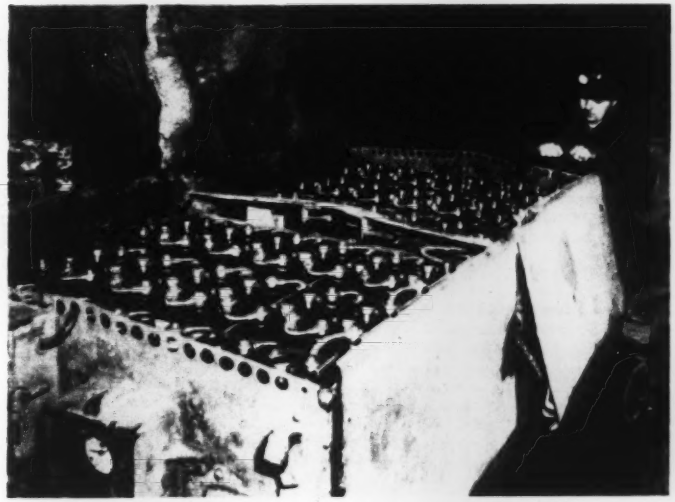

Batteries Power Blasting Project

Mild-appearing locomotive storage batteries connected in series prepare to furnish 400 volts of power for a blasting project at International Nickel Co. of Canada Ltd.'s Frood-Stobie mines near Copper Cliff, Ont. Some 64 tons of explosives and drilling of 2000 blastholes set the stage for an explosion which reduced to handling size two blocks holding 400,000 tons of nickel-copper ore

Hill of Chicago, secretary and executive director.

Sierra Drawn Steel Expands

Sierra Drawn Steel Corp., Los Angeles, established a mill in Seattle capable of handling cold-finished bars from $1\frac{1}{2}$ in. to 6 in. This is the only independently owned cold-finishing bar mill on the West Coast.

Steel City Buys Charter Metals Co.

Steel City Mfg. Co., Youngstown, purchased the business of Charter Metals Co., Pittsburgh, and will move it to Youngstown. Charter Metal makes newspaper display racks, "honor" boxes and delivery tubes while Steel City makes fountains and beverage coolers.

Hall Heads Electrical Manufacturers

L. G. Hall, president, Stackpole Carbon Co., St. Marys, Pa., was elected president, National Electrical Manufacturers Association, New York. He succeeds J. F. Lincoln, president, Lincoln Electric Co., Cleveland. Vice presidents are: Arthur A. Berard, president, Ward Leonard Electric Co., Mt. Vernon, N. Y.; J. L. Busey, vice president, General Electric Co., New York; J. W. Corey, president, Reliance Electric & Engineering Co., Cleveland; W. A. Elliott, president, Elliott Co., Jeannette, Pa.; and Hoyt Post Steele, executive vice president, Benjamin Electric Mfg. Co., Des Plaines, Ill. A. F. Metz, president, Okonite Co., Passaic, N. J., was elected treasurer. Chosen as members-at-large are: J. H. Jewell, vice president, Westinghouse Electric Corp., Pittsburgh, and Alan F. Sheldon, president, Kennecott Wire & Cable Co., Phillipsdale, R. I.

Metco Corp. Opens Offices

Metco Corp., a newly-formed company for the development and manufacture of test equipment and related products, opened offices and laboratories in Dayton, O. Metco also equipped a plant for the manufacture of special production equipment, parts and test components. The firm will design and make special devices and training devices for military and civilian production. It will prepare handbooks and technical illustrations and will conduct research in various fields related to its work.

Pacific Boiler Appoints Agent

Pacific Boiler Division, United States Radiator Corp., Detroit, appointed Fletcher Sales Co., Louisville, as its representative in that area.

Machinery Firm Buys Octigan Forge

H. & B. American Machine Co., Pawtucket, R. I., acquired all the outstanding stock of Octigan Forge & Mfg. Co., Chicago. The Octigan firm, a 50-year old producer of fine quality forgings for the railroad and automobile industries, will be operated as the Octigan Forge Division of H. & B. American Machine Co. The parent company recently acquired Midwest Tool & Engineering Co., Indianapolis, which is a large user of forgings.

Heller To Build Branch Factory

Heller Co., Cleveland, is purchasing a site in Azusa, Calif., for construction of a branch factory, warehouse, and administrative offices.

Consolidated Engineering Expands

Consolidated Engineering Corp., Pasadena, Calif., purchased the equipment manufacturing portion of the Distillation Products Division, Eastman Kodak Co. The division manufactures high-vacuum equipment. The

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purchase is expected to increase Consolidated's sales by $4 million annually.

Resistor Maker To Build in South

International Resistance Co., Philadelphia, is erecting a $200,000 plant in Asheville, N. C. The plant is scheduled to be completed by the spring of 1953. H. J. McCauly will manage the new manufacturing facilities.

North American Aviation Expands

North American Aviation Inc., Downey, Calif., added 134,000 sq ft of engineering and rocket engine manufacturing area to its plant at 6329 E. Slauson Ave. Design, development, and manufacturing of rocket engines for long-range guided missiles will be undertaken.

Kingswell To Distribute Heat Panels

Mechanical Goods Division, United States Rubber Co., New York, appointed William E. Kingswell Inc., Washington, as a distributor for its radiant heat panels.

Clark Equipment Appoints Dealers

Industrial Truck Division, Clark Equipment Co., Battle Creek, Mich., appointed Hull Equipment Co., Union, N. J., and Towne Industrial Equipment Co. Inc., Dallas, as dealers for its materials handling products in their respective territories.

Westinghouse To Build Plant

Meter Division, Westinghouse Electric Corp., Pittsburgh, will erect a $10 million plant near Raleigh, N. C. Erection of the plant is scheduled to begin on Mar. 1; actual production, late in 1954.

Ernest T. Weir Launched

Ernest T. Weir, largest ship ever built on fresh water, was launched Nov. 19 in the Lorain, O., yards of American Shipbuilding Co. She is owned by National Steel Corp., Pittsburgh, and will be operated by M. A. Hanna Co., Cleveland. The carrier has an over-all length of 690 ft; length of keel, 670 ft 3 in.; 70-ft beam; displacement of 28,670 long tons; deadweight tonnage of 21,770 tons. Sea trials and delivery of the ship are scheduled for next year.

Frick Co. Marks 100th Anniversary

In 1953, the 100th anniversary of Frick Co., Waynesboro, Pa., will be celebrated. Major work of the company is still concerned with the food industries, including farming, processing, storing, transporting and retailing. At the same time, the company has far reaching activities in air conditioning, chemical work, general manufacturing, lumbering, export and many other fields. The company offers a combination of services: engineering, sales, manufacturing and installation.

Dow Names Magnesium Anode Agent

Royston Laboratories Inc., Blawnox, Pa., manufacturer of protective coatings, was named distributor for Dow magnesium anodes for the protection of underground and underwater structures. The anodes are manufactured by Dow Chemical Co., Midland, Mich.

Applied Research Expands Abroad

Plans for establishment of a branch factory at Lausanne, Switzerland, to supply spectrochemical equipment to European manufacturers, were announced by Applied Research Laboratories, Glendale, Calif. In reporting this project in a previous issue of STEEL, the firm's name was incorrectly given. The plant will be ready for operation about Jan. 1.

Steel Exporters Elect Officers

Herbert N. Goettlich, president New York International Inc., Lyndhurst, N. J., was elected president of National Association of Steel Exporters, New York. Vice presidents are: Ben Livingston, president, Livingston & Southard Inc.; Herbert Winter, president, Winter-Wolfe Inc.; Jerome Siegel, president, Titan Industrial Corp.; William Fabrikant, president Fabrikant Steel Co. Inc.; Marcel Loeb, president, Marcel Loeb Co. Inc., was elected secretary; Eric Friedl, vice president Monroe International Corp., treasurer.

Furnace Makers Open New Offices

Industrial Furnace Manufacturers Association opened offices at 412 Fifth St. N. W., Washington. T. F. Sheckels, formerly associated with the Industrial Heating Division, National Production Authority, has been appointed secretary.

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Walnut Shells Find a New Use

Firestone Tire & Rubber Co. puts English walnut shells to surprising uses at its Akron plants. Finely ground shells are efficient cleaners for aluminum tire molds, replacing sand and other materials which may pit the aluminum. Here a worker handles some of 125,000 pounds of shells used yearly for mold cleaning

Grinding Wheel Group Names Officers

Earl C. Hughes, vice president, Bay State Abrasive Products Co., Westboro, Mass., was elected chairman of the board of directors of Grinding Wheel Institute, Cleveland. He succeeds George F. Kohn, president, Precision Grinding Wheel Co., Philadelphia. H. Paul Floyd, vice president, Waltham Grinding Wheel Co., Waltham, Mass., was re-elected president of the institute; Clarence E. Etheridge, secretary, Macklin Co., Jackson, Mich., was re-elected vice president.

Sylvania To Build Electronics Plant

Sylvania Electric (Canada) Ltd. is carrying out preliminary work for a $1 million electronics plant in Drummondville, Que. The company is manufacturing fluorescent lighting tubes and photoflash bulbs in leased premises in that city.

Superior Industries Inc. Expands

Superior Industries Inc., Youngstown, is building a 20,000 sq ft addition to its plant as well as a 2500 sq ft addition to the plant of its affiliate, Aluminum Billets Inc. The company is installing a 1150-ton extrusion press.

Crosman Arms Buys Factory

Crosman Arms Co. purchased Cobb Preserving Co.'s plant in Fairport, N. Y., and will transfer its manufacturing operations from Rochester, N. Y., to the new location next summer. The Fairport plant has triple the floor space of the firm's present plant. The company manufactures air rifles and pistols.

Chiksan Forms Canadian Subsidiary

Chiksan Co., Brea, Calif., established a Canadian subsidiary, Chiksan of Canada Ltd., with H. J. Hagn as president. The firm plans to build a plant in Brantford, Ont., for the manufacture of Chiksan ball-bearing swivel joints. It is also expected that unions, blocks and other products of the Well Equipment Mfg. Corp., a division of Chiksan, will be made at this new plant. The recently expanded Edmonton, Alta., office of Chiksan Export Co. will be operated under Chiksan of Canada Ltd.

Syntron Opens Cleveland Office

Syntron Cleveland Sales Co., representing Syntron Co., Homer City, Pa., opened a store at 2919 Carnegie Ave., Cleveland. Syntron Co. manufactures vibratory materials handling equipment, selenium rectifiers, shaft seals, paper joggers, heating elements, etc.

Wheeling Steel Observes Milestone

Wheeling Steel Corp., Wheeling, W. Va., held an open house recently at its La Belle Works in celebration of the plant's 100th anniversary. Annual production of the La Belle Works is about 240,000 kegs of cut nails in sizes ranging from 8-inch boat spikes to $\frac{7}{8}$-in. clout nails.

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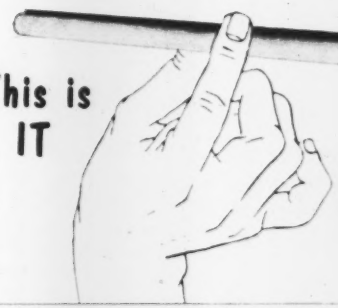

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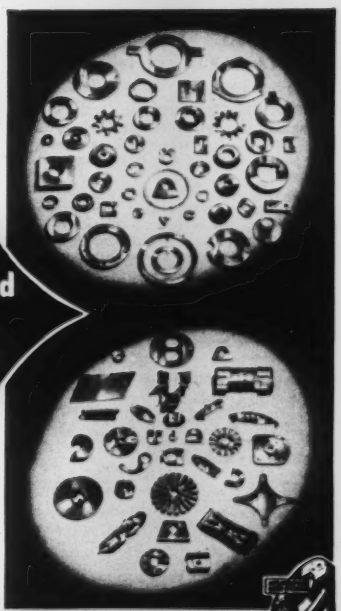

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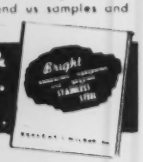

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WORM GEARING—universal in its application—affords advantages for almost every power transmission job. Whether you want worm gearing sets or speed reducer units, you will find drives to meet your need in the complete Cleveland line. Write for new 180-page Catalog 400, just off press.

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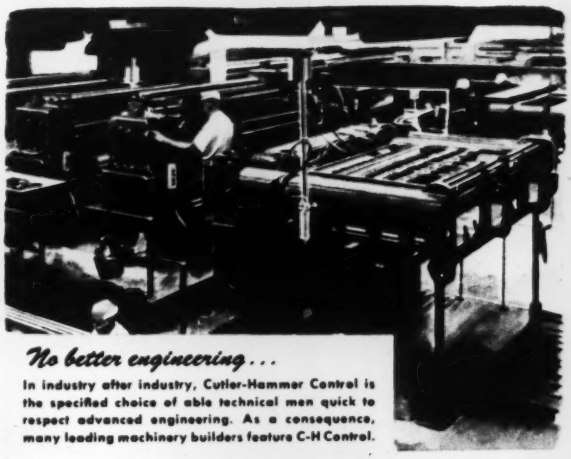

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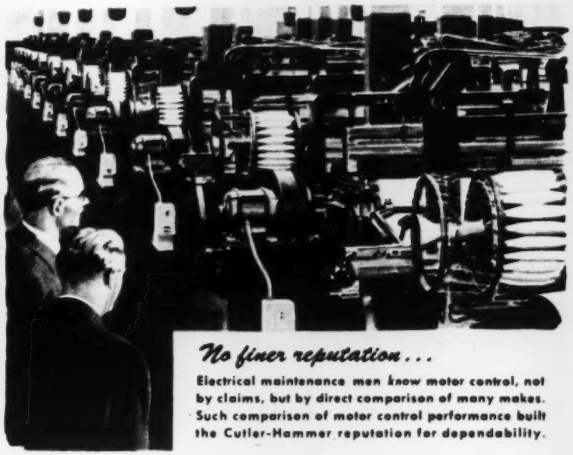

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